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ABSTRACT

This study evaluated the situation of women and minorities at the Air Force Academy addressing differences in performance indicators, cadets' perceptions, and Academy actions to enhance the success of women and minorities. Performance indicators for male and female cadets showed mixed results. Minority cadets had comparable physical fitness scores, lower academic admissions scores, lower academic grade point averages, and lower military performance averages than white cadets. Minorities were also subjected to more academic and honor reviews than whites. Minority cadets had higher attrition rates. A survey of cadets revealed perceptions that women and minorities generally received treatment equal to that of men and whites. However, a higher percentage of men than women perceived that women were treated better, and a slightly higher percentage of women than men perceived that they were treated worse. The study concluded that, although the Academy has taken a number of steps that should help women and minorities succeed at the Academy, it does not have a consolidated data base to analyze changes in student performance indicators and has not established criteria for determining when performance differences are significant. (Appendixes contain the Academy's review systems, methodology information, analysis of data, and list of contributors to the report.) (Author/JB)

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United States General Accounting Office

GAO

Report to the Chairman, Committee on Armed Services, U.S. Senate

September 1993

AIR FORCE ACADEMY

Gender and Racial Disparities

ED 363 189

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United States
General Accounting Office
Washington, D.C. 20548

National Security and
International Affairs Division

B-254084

September 24, 1993

The Honorable Sam Nunn
Chairman, Committee on Armed Services
United States Senate

Dear Mr. Chairman:

In response to your request and that of the former Chairman of the Subcommittee on Manpower and Personnel, we reviewed the treatment of women and minorities at all three of the service academies. This report deals with the Air Force Academy. Specifically, the report addresses (1) differences in performance indicators between men and women and between whites and minorities, (2) cadets' perceptions of the fairness of the treatment that female and minority cadets receive, and (3) actions the Academy has taken to enhance the success of women and minorities at the Academy.

As arranged with your office, unless you publicly announce the contents of this report earlier, we plan no further distribution of it until 15 days from the date of issue. At that time, we will send copies to interested congressional committees, other interested Members of Congress, the Secretaries of Defense and the Air Force, and the Superintendent of the Air Force Academy. We will also make copies available to other parties on request.

This report was prepared under the direction of Mark E. Gebicke, Director, Military Operations and Capabilities Issues, who can be reached on (202) 512-5140 if you or your staff have any questions. Other major contributors to this report are listed in appendix IV.

Sincerely yours,

Frank C Conahan

Frank C. Conahan
Assistant Comptroller General

Executive Summary

Purpose

Concerned about how well the military academies were treating women and minorities, the Chairman of the Senate Committee on Armed Services and the former Chairman of its Subcommittee on Manpower and Personnel asked GAO to examine the issue. In April, GAO reported on disparities at the Naval Academy, and GAO is currently preparing a report on the Military Academy. This report deals only with the Air Force Academy and addresses (1) differences in performance indicators between men and women and between whites and minorities, (2) cadets' perceptions of the fairness of the treatment that female and minority cadets receive, and (3) actions the Academy has taken to enhance the success of women and minorities at the Academy. This report does not address the causes of any gender or racial differences in the performance indicators.

Background

Congress authorized the creation of the Air Force Academy in 1954, and as the newest of the U.S. service academies, it has admitted minorities since its creation. The first graduating class, the class of 1959, included one Asian American but no blacks. At that time, the Academy did not maintain records on other ethnic groups such as Hispanics and Native Americans. The first graduating class to include blacks was the class of 1963, which had three black graduates. Women were not allowed to attend the Academy until 1976. In that year, the entering class included 157 women, or about 10 percent of the class. Of the 1,406 cadets admitted to the graduating class of 1993, 173 (about 12 percent) were women, and 272 (about 19 percent) were minorities.

Results in Brief

Performance indicators for male and female cadets showed mixed results—each group fared better in some comparisons and worse in others. For example, women have not fared as well as men in their admissions qualification rates and their physical fitness test scores. Women also had higher attrition rates than men did, and proportionately fewer women were in the top 15 percent of their graduating classes. Men, however, received proportionately fewer admissions offers than women and had lower academic admissions scores.

While minority cadets had comparable physical fitness scores, they had lower academic admissions scores, academic grade point averages, and military performance averages than white cadets. Minorities were also subjected to proportionately more academic and honor reviews than whites were. Minority cadets had higher attrition rates, and

proportionately fewer minority cadets were either in the top 50 percent or the top 15 percent of their graduating classes.

A GAO survey of cadets revealed perceptions that women and minorities generally received treatment equal to that of men and whites. However, a higher percentage of men than women perceived that women were treated better, and a slightly higher percentage of women than men perceived that they were treated worse. Similarly, a higher percentage of whites than minorities perceived that minorities were treated better, and a higher percentage of minorities than whites perceived that they were treated worse.

Over the past few years, the Academy has taken a number of steps that should help women and minorities succeed at the Academy. However, it does not have a consolidated data base to analyze changes in student performance indicators. Neither has it established criteria for determining when performance differences are significant. Finally, the Academy has not documented specific actions it has taken or plans to take to implement prior equal opportunity recommendations.

Principal Findings

Gender Differences in Academy Student Data

Overall, GAO made gender comparisons across 12 indicators, covering various areas of Academy performance. In 2 of the 12 indicators, significance tests consistently showed that women did better: offer rates and academic admissions scores. In 3 of the 12 indicators, significance tests consistently showed that men did better: qualification rates, physical fitness scores, and attrition rates. In four indicators, comparisons show mixed results: academic grade point averages, cumulative military performance averages, Academic Board review and separation rates, and class standings.

While women's overall grade point averages were lower than men's, women tended to receive lower grades than men in their freshman and sophomore years but higher ones in their junior and senior years. For the classes of 1980-92, about 40 percent of female cadets left before graduating, as compared to 33 percent of male cadets who did so. While the percentages of female and male cadets in the top halves of their

graduating classes were essentially equal, a smaller percentage of female cadets were in the top 15 percent.

Racial Differences in Academy Student Data

In 7 of the 12 indicators GAO used to measure performance, significance tests consistently showed that whites did better: qualification rates, academic admissions scores, academic grade point averages, cumulative military performance grades, Academic Board review and separation rates, attrition rates, and class standings. In only one of the indicators—offer rates—did significance tests clearly show that minorities did better. In three indicators, comparisons showed mixed results: physical fitness scores, rates of conduct review, and honor charge and conviction rates.

For the classes of 1988 through 1992, 29 percent of minority cadets, versus 53 percent of whites, graduated in the top halves of their classes. Six percent of minority cadets, versus 16 percent of white cadets, graduated in the top 15 percent. Regression analysis results indicate that a correlation between lower grades and minority students exists even after the difference in success predictor scores is accounted for. Also, a significantly higher proportion of minority cadets were subjected to academic reviews than were white cadets, and a significantly higher proportion of minority cadets were academically disenrolled from the Academy.

Minority cadets fared worse than white cadets in the earlier stages of the honor adjudicatory process but better at the Honor Sanctions Board stage (during which cadets are recommended for disenrollment). Minorities were more frequently accused of, investigated for, and found guilty of honor offenses, but they were disenrolled less frequently than their white counterparts. Minority and white cadets fared the same in the conduct review process.

Perceptions of the Treatment of Women and Minorities

The majority of cadets responding to a GAO questionnaire perceived that in general women and minorities received the same treatment as men and whites by faculty members and by disciplinary boards. However, over one-third of the men believed that women received better treatment by the disciplinary, honor, and academic review boards and the faculty. Similarly, between one-quarter and one-third of the whites believed that minorities received better treatment in these categories, while about one-quarter of minority respondents believed that minorities received less favorable treatment.

Academy Actions to Address Issues That Affect Women and Minorities

Over the past few years, the Academy has taken a number of steps to address issues affecting women and minorities. For example, it requires that all cadets complete courses in human relations and has created several councils and committees to offer guidance and counseling to students in the treatment of women and minorities. In 1992, the Academy's Department of Behavioral Sciences and Leadership administered to 3,900 of the Wing's 4,400 cadets a survey of attitudes and behaviors toward sexual harassment and racial discrimination. In February and March 1993, the Defense Equal Opportunity Management Institute visited the Academy and made recommendations to improve the human relations climate there. Finally, on May 20, 1993, the Academy's Ad Hoc Committee on Respect and Dignity issued a report recommending major human relations initiatives.

Nevertheless, the Academy has no consolidated data base with which to systematically track cadets' performance while at the Academy. Because it lacks such a data base, the Academy and others have had difficulties obtaining the information needed to determine changes in the extent of any disparate treatment. The 1992 survey the Academy conducted to measure cadets' attitudes identified areas in which relations among whites, minorities, and women could be improved. However, the Academy has not determined whether disparities in cadet performance are statistically significant. Nor has the Academy prepared a document outlining actions to be taken in response to the survey. This lack makes evaluating the effectiveness of corrective actions difficult.

Recommendations

GAO recommends that the Superintendent of the Air Force Academy take actions to improve the monitoring and evaluation of gender and racial disparities. Such actions should include (1) developing a comprehensive data base of student performance data, (2) establishing criteria for determining when student performance differences are significant, and (3) preparing a consolidated program document to track recommendations and corrective actions.

Agency Comments

As requested, GAO did not obtain fully coordinated Department of Defense comments on this report. However, GAO did discuss a draft of this report with senior officials from the Academy and cognizant officials of the Air Force and the Office of the Secretary of Defense. They suggested a number of technical clarifications, which have been incorporated in this

report, and indicated that the Academy was taking actions in line with most of GAO's recommendations.

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Introduction

The U.S. Air Force Academy provides a 4-year educational and military program that culminates in a bachelor's degree. While attending the Academy, cadets receive pay currently amounting to $543.90 a month. In return for their education, cadets agree to serve a minimum of 5 years on active duty after graduation.[1] Upon graduation, cadets are commissioned as second lieutenants in the U.S. Air Force.

Cadet life at all military service academies is demanding and, in many ways, different from life at "typical" U.S. universities. In addition to completing the course work and maintaining at least a 2.0 cumulative academic grade point average (on a 4-point scale), cadets must participate in rigorous military training activities and compete in intramural or intercollegiate sports. Little time remains for rest and relaxation.

Representation of Women and Minorities at the Academy

As the newest of the U.S. service academies, the Air Force Academy has admitted minorities[2] since its creation by Congress in 1954. The first graduating class, the class of 1959, included one Asian American but no blacks. At that time, the Academy did not maintain records on other ethnic groups such as Hispanics and Native Americans. The first graduating class to include blacks was that of 1963, with three black graduates.

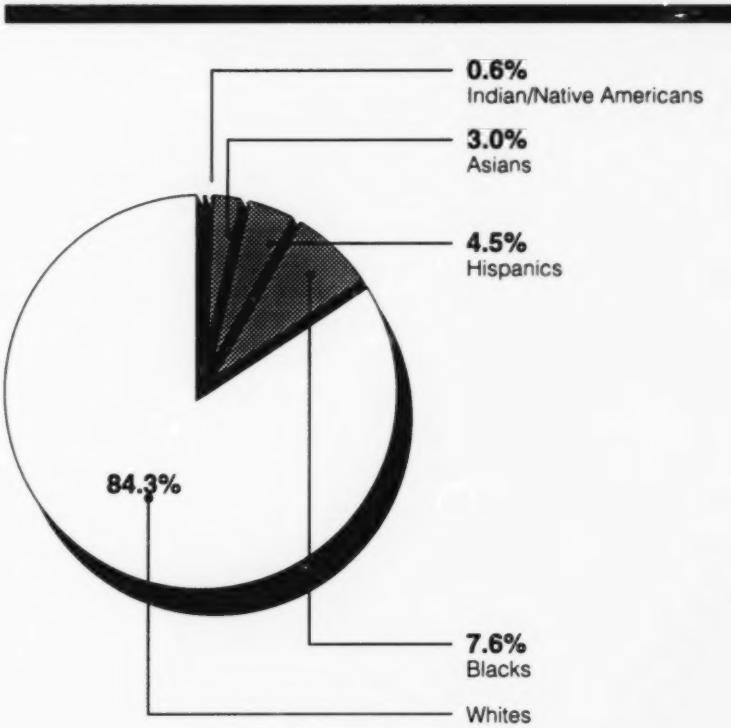
Women, on the other hand, were not allowed to attend the Academy until 1976. In that year, the entering class included 157 women, or about 10 percent of the class, and 192 minorities, or about 12 percent. The 1980 graduating class, the first to include women, included 97 women, or about 11 percent of the class, and 97 minorities, also about 11 percent.

Since then, the percentages of minority and women graduates of the Academy have fluctuated year to year but have not changed significantly. From 1980 through 1990, the percentages of women in the graduating classes ranged from 7 to 13 percent, and the percentages of minorities from 11 to 16 percent. Of the 1,406 cadets admitted to the graduating class of 1993, 173 (about 12 percent) were women, and 272 (about 19 percent) were minorities.

[1]This obligation will increase to 6 years beginning with 1996 graduates.

[2]A "minority" is defined as one whose racial or ethnic origin is American Indian or Alaskan native, Asian or Pacific Islander, black, or Hispanic. These categories, according to the Office of Management and Budget, are to be used in maintaining and reporting federal statistics.

Figure 1.1: Percentage of Minority Groups in Student Body (as of June 4, 1993)



Source: Academy records.

The Academy's Organizational Structure

The Superintendent is the commanding officer of the Air Force Academy and of the military post. The Superintendent is assisted by a staff that helps coordinate academic, military, and athletic training. The following positions have been established by statute: (1) a Dean of the Faculty, who is a permanent professor; (2) a Commandant of Cadets; (3) 21 permanent professors; (4) a chaplain; and (5) a Director of Admissions. The Dean is responsible for the academic programs; the permanent professors and the Director of Admissions exercise command only in the academic department. The Commandant oversees the cadets and supervises their military and physical training and discipline.

The "Cadet Wing" (or the student body) is made up of 4 groups of 10 squadrons, each squadron consisting of about 110 cadets. Each group is directed by an Air Force officer with the title "Air Officer Commanding."

A chain of command of both Air Force and cadet officers oversees the Cadet Wing. The Commandant of Cadets, a commissioned officer, directs the Wing, and his or her staff guides it, provides military instruction, and directs cadet aviation programs. Commissioned officers and cadets interact regarding proposed changes to policies and regulations. Upper-class cadets (seniors and juniors, who are referred to as "first-class" and "second-class" cadets, respectively) fill leadership positions within the Cadet Wing. They lead the Wing during the school year and manage and instruct the summer programs and various aviation courses.

Admission and Graduation Requirements

To qualify for admission to the Academy, an applicant must meet several requirements. He or she must (1) be at least 17 years old and no older than 21 on July 1 of the year entering the Academy; (2) be a U.S. citizen (international students authorized admission are exempt from this requirement); (3) be of high moral character; (4) meet leadership, academic, physical, and medical standards; and (5) be unmarried, with no dependents. In addition, to receive an appointment to the Academy, an applicant must be nominated, usually by a Member of Congress. A Member of Congress and the Vice President may each recommend no more than 5 cadets for admission to the Air Force Academy at any one time, but they may nominate up to 10 candidates for each vacancy. Other nomination categories include (1) the children of deceased or disabled veterans or career military personnel and (2) enlisted members of the regular Air Force, Air Force Reserve, and Air National Guard.

Academic Admissions Scores

The Academy uses a rating system to determine applicants' eligibility for admission. This system combines an applicant's high school or college academic performance, college entrance examination scores, athletic performance, and public or community leadership positions into a composite admissions score. The composite admissions score is made up of three components:

- The academic component, 60 percent of the composite score, includes high school or college academic performance, as well as scores achieved on the Scholastic Aptitude Test or the American College Testing.

- The extracurricular component, 20 percent of the total composite score, includes athletic participation, leadership positions in public or community affairs, and work experience.
- The admissions panel component, 20 percent of the total composite score, includes the results of the faculty and staff review, the candidate fitness test, the Liaison Officer interview, and the writing sample review.

According to Academy officials, the academic component is a good predictor of academic success at the Academy. Academy officials maintain that cadets who enter the Academy with the highest academic admissions scores are those who will most likely earn the highest grades at the Academy, regardless of their race, ethnicity, or gender.

Graduation Requirements

To graduate from the Academy, a cadet must demonstrate an aptitude for commissioned service, leadership, and acceptable conduct. Specifically, a cadet must maintain a cumulative academic grade point average of 2.0, must maintain a cumulative military performance average of 2.0 (also on a scale of 4.0), and must fulfill all physical education requirements.

Cadets' success at the Academy affects their career choices. Those in the top 15 percent of their classes are given preference for graduate school. Also, the higher their class standing, the better their chance of receiving the post-Academy assignment they desire. For example, slots for certain flight programs are limited and very popular among top-ranking graduates.

Cadet Life

A typical daily schedule for cadets begins with reveille at 6:30 a.m. and concludes with taps at 11:00 p.m. In between, cadets typically attend three to four 50-minute academic periods. The cadets also have to march to breakfast and lunch (but not to dinner), and after classes, they participate in mandatory athletic activities (either intercollegiate athletics or intramural teams). Intercollegiate athletes usually practice or compete every afternoon and frequently on weekends. Intramural teams meet two afternoons a week after classes, leaving three afternoons for studying or conducting personal business. In addition, cadets participate daily in various military activities.

Because of their demanding academic schedules, many cadets take additional academic instruction after classes or during other unscheduled times. Cadets spend many evenings studying in their rooms or in the library. Frequently, cadets are required to attend parades and inspections

on Saturday mornings, but they usually have Saturday afternoons and Sundays free.

Each year, the new class enters in the summer and begins an intensive 5-week period of military training called "Basic Cadet Training." In their second year, cadets are required to take Survival, Evasion, Resistance, and Escape training during the summer. Cadets also take a 1-week continental U.S. field trip during which they visit two Air Force bases to acquaint them with the missions of major air commands. They also participate in parachuting or "soaring."[3] In their third summer, cadets begin to train both third-class (sophomore) and fourth-class (freshmen) cadets. Cadets may serve as instructors in Basic Cadet Training; Survival, Evasion, Resistance, and Escape training; parachuting; soaring; navigation; or other programs. They also participate in Operation Air Force, a 3-week worldwide program at an operational Air Force base, to observe and gain a better understanding of the duties of officers and enlisted personnel.

Air Force Academy's Review Systems

The Academy's various review and disciplinary functions are carried out under the auspices of a legislatively established Academy Board (10 U.S.C. 9351). Composed of senior Academy officers, the Board reviews cadets who are deficient in conduct; integrity; and physical, military, and academic performance. The Board recommends whether deficient cadets should be discharged or separated from the Academy. (See app. I for a discussion of the Academy's review systems.)

Objectives, Scope, and Methodology

The Chairman of the Senate Committee on Armed Services and the former Chairman of its Subcommittee on Manpower and Personnel asked us to examine the treatment of women at the military academies. Subsequently, former Congressman Albert G. Bustamante asked us to review the treatment of minorities. This report responds to both requests. We have previously reported on disparities at the Naval Academy[4] and are preparing a report on the Military Academy.

The objectives of our review were to (1) assess whether significant differences exist between men and women and between whites and minorities on a variety of performance indicators, (2) identify cadets' perceptions regarding the fairness of treatment of female and minority

[3]In the Academy's soaring program, cadets are taught to fly sailplanes and/or motorgliders at altitudes in excess of 30,000 feet.

[4]See also Naval Academy: Gender and Racial Disparities (GAO/NSIAD-93-54, Apr. 30, 1993).

students, and (3) determine what actions the Academy has taken to enhance the success of women and minorities at the Academy.

We performed our review at the Air Force Academy, in Colorado Springs, Colorado, where we reviewed policies, regulations, and procedures and interviewed Academy officials and faculty members. We also administered three questionnaires: one to cadets, one to faculty members, and one to the Commandant's staff and other officers. In the spring of 1991, we administered questionnaires to randomly selected samples of 493 cadets, representing all four classes then at the Academy, and 157 faculty members. We also administered a questionnaire to 52 members of the Commandant's staff (all Air Officers Commanding and those officers charged with formulating policy for the Cadet Wing), 7 chaplains, and 6 counselors. The questionnaires covered a range of student-related subjects, including the treatment of women and minorities. A detailed description of the questionnaire and related methodological issues appears in appendix II.

The performance indicator data we used to make gender and racial group comparisons covered a spectrum of student experiences, from application through graduation. The available data varied in the time periods covered. Some data were available by class year, some by academic year, and some from secondary sources.

We discussed with Academy officials the indicators that would best capture cadet performance. On the basis of these discussions, we selected the following indicators.

- Admissions data: (1) the percentage of eligible candidates who received offers from the Academy and (2) the academic admissions scores of those entering the Academy.
- Performance data: (1) the academic cumulative grade point average, which is the numeric average of academic course grades achieved by a cadet; (2) the military performance average, which is the numeric average of grades achieved by a cadet through semester evaluations of military performance and of aptitude for commissioned service; (3) representation in cadet leadership positions, ranging from sergeant to colonel; and (4) physical fitness scores on a test composed of five events: pull-ups, the standing long jump, sit-ups, push-ups, and the 600-yard run.

- Adjudicatory system data: the rate at which cadets appeared before the Academy's honor, academic, and conduct adjudicatory systems[5] and the outcomes.
- Graduation data: (1) the attrition rate (the rate at which cadets separate from the Academy) and reasons for attrition; (2) the graduation rate, or the rate at which cadets satisfactorily complete the academic, aptitude, conduct, athletic, and military training requirements and receive a degree; and (3) class standing, or the ranking of cadets at graduation, based on the weighted combination of 70-percent academic grade point average and 30-percent military performance average.

We used statistical significance tests and a rule of thumb based on comparisons of subgroup percentages (called the "four-fifths test") to assess whether any observed gender or racial disparities were significant. A detailed description of the kinds of performance indicators used, the source of that data, and the types of tests used to assess differences appears in appendix III.

To assess whether any regularity existed with regard to the direction of observed differences, we identified the number of times each subgroup was lower or higher on each measure for each period we examined. We then considered the likelihood of getting that observed distribution of lows and highs if there were no systematic differences between the subgroups.

As requested, we did not obtain fully coordinated Department of Defense comments on this report. However, we did discuss a draft of this report with senior officials from the Academy and cognizant officials of the Air Force and the Office of the Secretary of Defense. They suggested a number of technical clarifications, which have been incorporated in this report, and indicated that the Academy was taking actions in line with most of our recommendations.

We performed our review from January 1991 to June 1993 in accordance with generally accepted government auditing standards.

[5]The Academy has three other adjudicatory systems: the Military Review Committee, the Summer Training Review Committee, and the Physical Education Review Committee. However, there were too few cases handled by the Military Review Committee and the Physical Education Review Committee to adequately analyze case data. Additionally, we did not analyze data for the Summer Training Review Committee.

Academy Indicators Reveal Gender Disparities

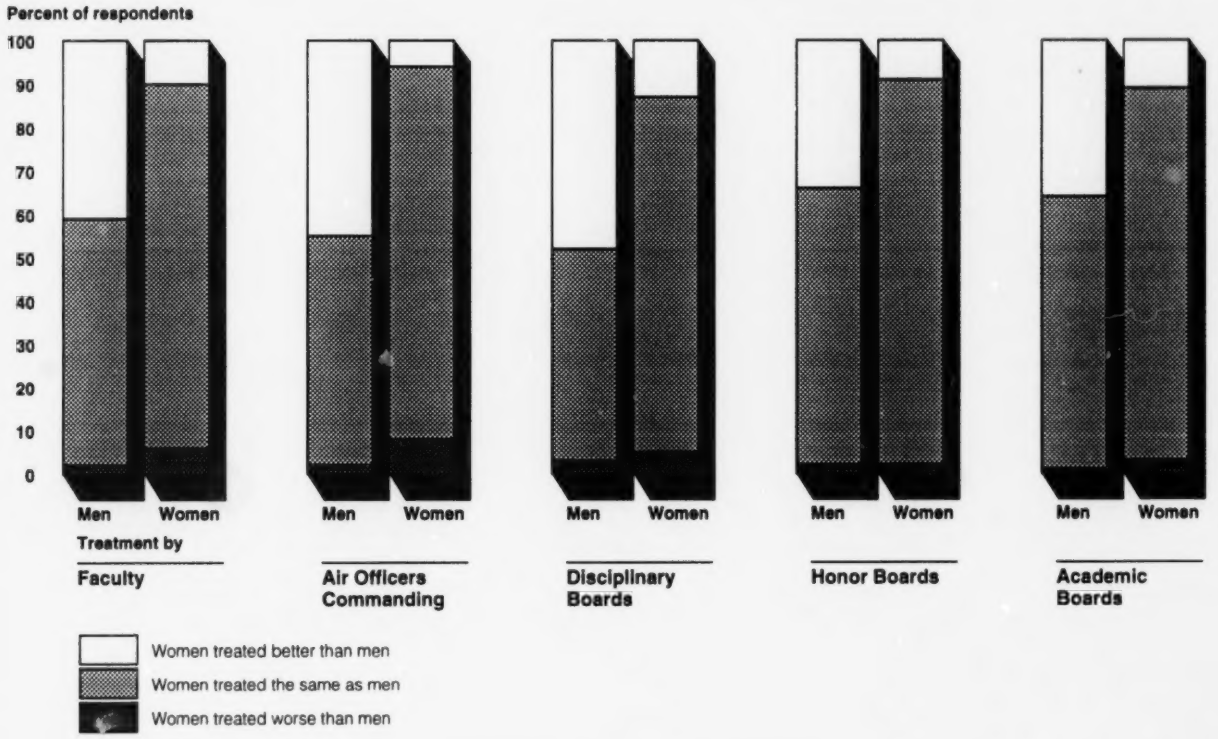
Male and female cadets' performance was mixed across the full set of indicators. On average, women have not fared as well as men in their admissions qualification rates and their physical fitness test scores. In addition, women had higher attrition rates than men did, and proportionately fewer women were in the top 15 percent of their graduating classes. On the other hand, men received proportionately fewer admissions offers than women and had lower academic admissions scores. Nearly all the women and most of the men we surveyed at the Academy perceived that women were treated the same as men.

Cadets' Perceptions of the Treatment of Women

In our questionnaire, we asked respondents to indicate whether they believed that women were treated better than, the same as, or worse than men by faculty, air officers commanding, disciplinary boards, honor boards, and academic boards.

Between 82 and 89 percent of female cadets and 49 and 65 percent of male cadets believed that women were treated the same as men by these various groups. Less than 10 percent of female cadets and less than 5 percent of male cadets believed that women were treated worse than men by any of these groups. Between 34 and 48 percent of male respondents believed that female cadets received preferential treatment, but only 10 percent of the female respondents shared that perception (see fig. 2.1).

Figure 2.1: Cadets' Perceptions of the Treatment of Women by Various Academy Groups



Source: Responses to GAO questionnaire.

Performance Indicators for Male and Female Cadets Show Mixed Results

Overall, as summarized in table 2.1, we made gender comparisons across 12 indicators, covering various areas of Academy performance. In 2 of the 12 indicators, significance tests consistently showed that women did better: offer rates and academic admissions scores. In 3 of the 12 indicators, significance tests consistently showed that men did better: qualification rates, physical fitness scores, and attrition rates. In four indicators, comparisons show mixed results: academic grade point averages, cumulative military performance averages, Academic Board review and separation rates, and class standings. A discussion of these indicators and our analysis follow.

Table 2.1: Summary of Gender Comparisons

Performance indicator	Data available	Number of comparisons	Comparisons that showed that women did better	Comparisons that showed that men did better	Comparisons that showed men and women equal
Qualification rates (see fig. 2.2)	Classes of 1991-95	5	0 (0)	5 (5[a])	0
Offer rates (see fig. 2.3)	Classes of 1991-95	5	5 (5[a])	0 (0)	0
Academic admissions scores (see fig. 2.4)	Classes of 1988-94	7	7 (4[b])	0 (0)	0
Academic grade point averages by semester (see fig. 2.5)	Classes of 1988-92	40	17 (7[b])	21 (11[b])	2
Physical fitness scores (see fig. 2.6)	Classes of 1988-92	5	0 (0)	5 (4[b])	0
Cumulative military performance averages by semester (see fig. 2.7)	Classes of 1988-92	40	22 (0[b])	15 (3[b])	3
Cadet leadership positions (see text)	Classes of 1988-92	5	2[c]	3[c]	0
Rates of conduct review (see text)	Academic years 1987-89	1	0 (0[a])	0 (0[a])	1
Honor charge and conviction rates (see text)	Academic years 1987-89	4	4 (0[a])	0 (0)	0
Academic Board review and separation rates (see text)	Academic years 1987-89	4	1 (1[a])	3 (1[a])	0
Attrition rates (see fig. 2.8)	Classes of 1980-92	13	2 (0[a])	11 (7[a])	0
Class standings (see text)	Classes of 1988-92	10	4 (0[a])	6 (2[a])	0

Note: ( ) indicates the number of significant differences using one or both types of tests.

[a]We used both a statistical significance and the 4/5s test for these comparisons.

[b]We used a statistical significance test for these comparisons.

[c]We were unable to test significance due to data limitations.

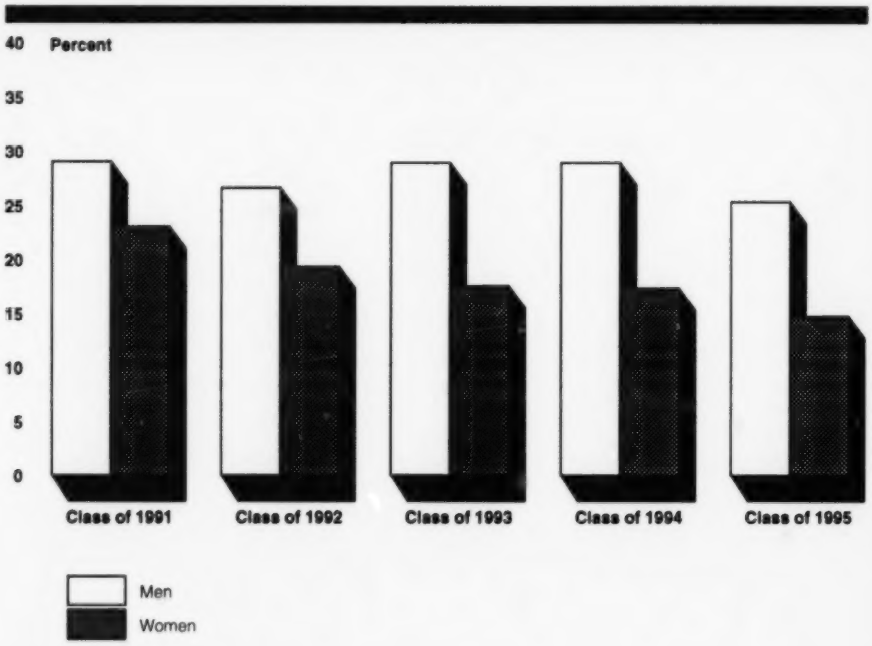
Qualification Rates and Admissions Offers

Qualification Rates Were Higher for Men

Admission standards, with the exception of some allowances for physical differences, are the same for women and men. For the classes of 1991 to 1995, male applicants were eligible at a higher rate than were female applicants. Female applicants were eligible about 18 percent of the time, while male applicants were eligible about 28 percent of the time (five

gender comparisons, one for each of five classes).[1] The higher rate for men was significant for all the classes, as shown in figure 2.2.

Figure 2.2: Qualification Rates for Men and Women



Note: All differences were significant using one or more tests.

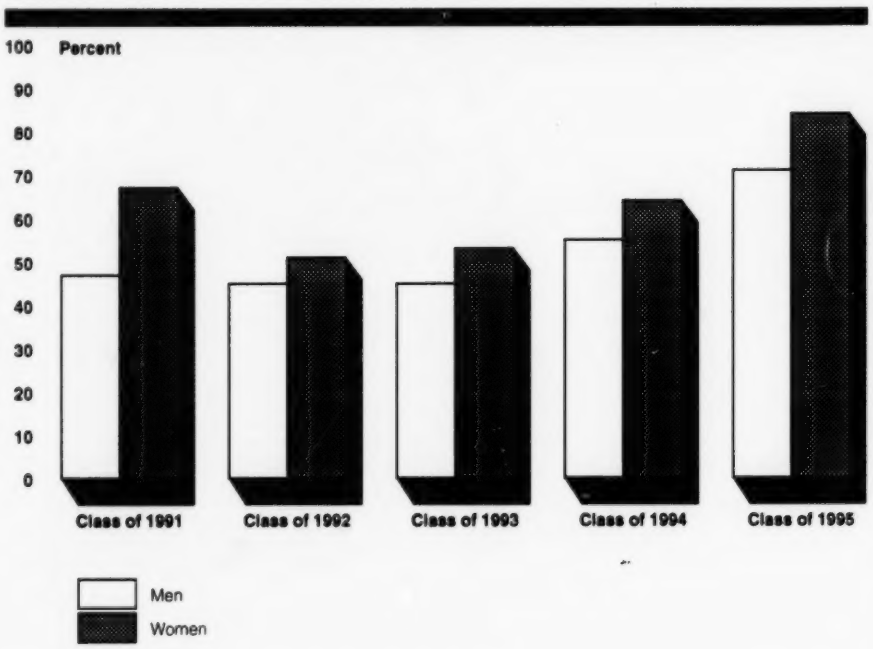
Source: GAO analysis of Academy records.

Women Received Admissions Offers at Higher Rates

Academy data indicate that for the classes of 1991 to 1995, 66 percent of the eligible female applicants received offers of admission from the Academy, while only 52 percent of the eligible male applicants did (five gender comparisons, one for each of five classes). The higher rate for women was significant for all the classes, as shown in figure 2.3.

[1]For presentation purposes, we do not always illustrate each comparison that we made because the pattern across semesters or class years was often similar. When we made comparisons for multiple years or semesters, we parenthetically note the numbers of comparisons we made.

Figure 2.3: Rates at Which Male and Female Eligible Candidates Received Offers



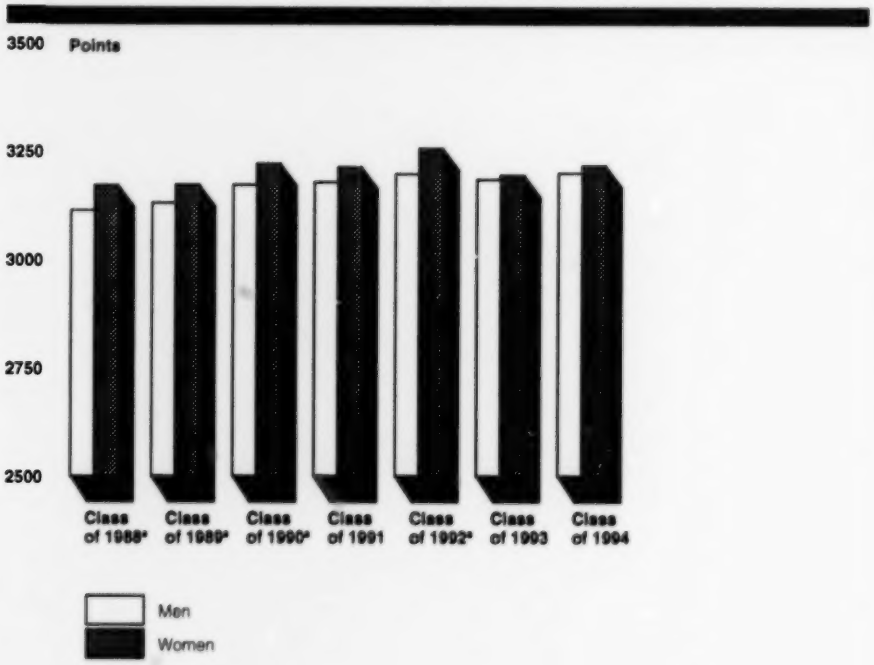
Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

Academic Admissions Scores

Our review of the classes of 1988 through 1994 showed that the average academic admissions scores of female cadets were consistently higher than those of male cadets (see fig. 2.4). This analysis involved seven comparisons, one for each of seven classes. The scholastic prediction system used in the Academy's admissions process is aimed at identifying applicants most likely to perform well there. The minimum composite admissions score for entrance is 2700. This score is calculated on the basis of academic performance (60 percent); extracurricular activities (20 percent); and faculty and staff review, a fitness test, a Liaison Officer interview, and a writing sample review (20 percent). Since women tended to have higher admissions scores, we would expect that for these classes, on average, women would be more successful at the Academy than men.

Figure 2.4: Average Female and Male Academic Admissions Scores



*Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

Military and Academic Performance and Physical Fitness

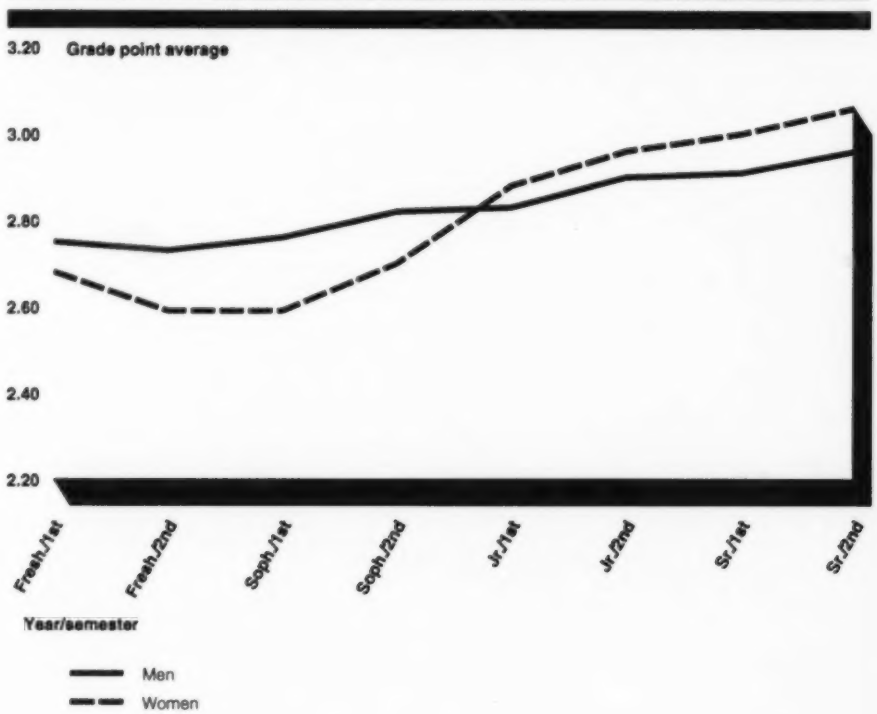
In general, we found the following:

- Over cadets' entire 4-year period at the Academy, women's grade point averages were slightly lower than men's. However, while female cadets generally received lower academic grade point averages than male cadets did during their early years, the opposite pattern generally existed in their junior and senior years.
- Women had lower physical fitness test scores than men did.
- In military performance, female cadets received grades generally comparable to those of male cadets.
- Female representation in cadet military leadership positions reflected their class representation.

Academic Grades

In the classes of 1988 through 1992, female cadets generally received lower cumulative academic grade point averages than male cadets during their freshman and sophomore years at the Academy. This analysis involved comparisons for 8 semesters for 5 classes, totaling 40 comparisons. The semester grades for the five classes have been combined in figure 2.5 for illustrative purposes. As shown in the figure, women got better grades in their junior and senior years.

Figure 2.5: Male and Female Cadets' Grade Point Averages for the Classes of 1988 Through 1992



Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

To assess whether the observed differences between the academic performance of male and female cadets were due to differences in academic potential that existed at the time they entered the Academy, we

performed a series of regression analyses.[2] For the classes of 1988, 1989, 1990, 1991, and 1992, we ran regression analyses on the cadets' cumulative grade point averages at the end of each of their eight semesters. Entrance predictor composite scores[3] were entered into the regression equation as the first step, with race entered as a second step, and gender added as a third step. All three variables were entered in each equation, regardless of any other criteria so that the direction of the relationship could be determined. This resulted in 40 separate regression analyses (8 for each of the 5 classes) where the independent effect of gender could be assessed.

Overall, the Academy's entrance predictor composite scores were able to account for a relatively low proportion (23 percent to 35 percent) of the total variation in semester grade point averages. After controlling for differences in entrance predictor composite scores, gender still explained a small (0.2 percent to 2.2 percent) but statistically significant (at the 95-percent level of confidence) proportion of the variance in grade point averages in 34 of the 40 regression analyses. All 40 regression coefficients were negative and ranged from –0.03 to –0.22. The average regression coefficient for gender across the 40 regressions was about –0.13, meaning that the grade point average of a female cadet averaged 0.13 lower than than of a male cadet of the same race with a comparable entrance predictor composite score. Thus, gender was correlated with academic performance beyond the difference that could be explained by differences in entrance predictor composite scores.

Physical Fitness Grades

Physical education standards at the Academy were derived on the basis of the historical achievement of separate gender groups over time, as they are intended to compensate for the physiological differences between men and women. For example, the minimum standard for pull-ups for male cadets is seven, while the standard for female cadets is one; these standards recognize males' greater upper body strength. The minimum standard for sit-ups for male cadets is 58, while the standard for female cadets is 60; these standards take into account females' greater abdominal strength. Males must run 600 yards in 2:03 minutes; women in 2:23 minutes. Males must complete a long jump of 7 feet; women must jump

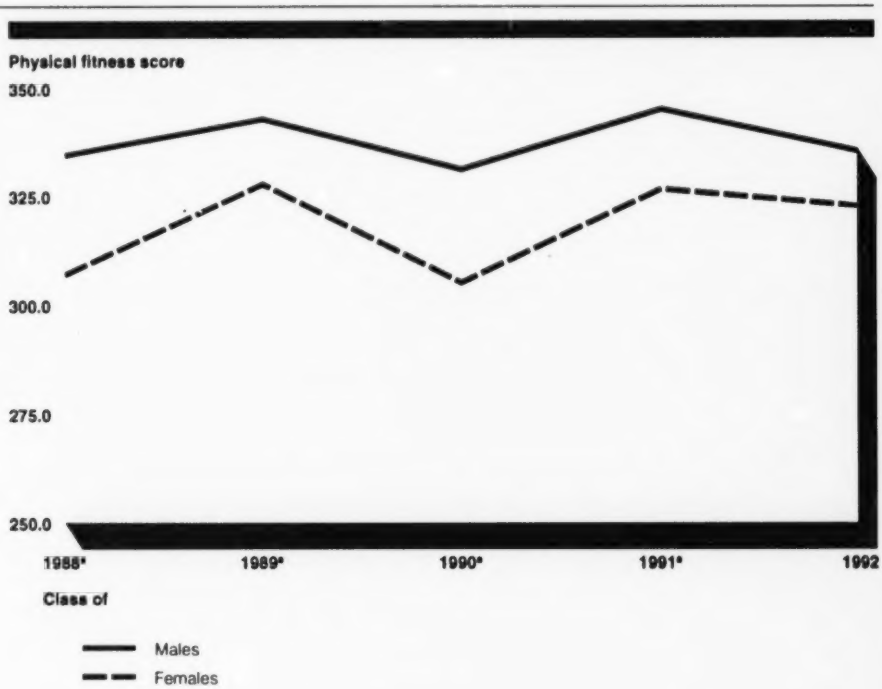
[2]A regression analysis is a statistical technique that allows the effects of multiple predictor variables to be simultaneously assessed. By entering the predictor variables into the regression analysis in separate steps, the unique contribution of a predictor variable to the variation in a criterion variable can be determined while the effects of all other measured predictor variables are controlled.

[3]We used the composite scores as an independent variable in this analysis because they are the main indicator that Academy officials use to predict academic success. We did not examine the development of this measure, and we make no assumptions about its validity in the admissions process.

5 feet, 9 inches. Narrative responses to our questionnaire revealed that some male cadets perceived the physical fitness test standards as favoring females.

Despite this perception of favoritism, the average physical education grades for the women in the classes of 1988 through 1992 were consistently lower than those of their male counterparts. (See fig. 2.6.) To pass the physical fitness test, which is composed of five athletic events, a cadet must accumulate at least 250 points and meet the minimum standards established for each of the five athletic events. Meeting the minimum standards alone results in a score of only 139 points, so a cadet must surpass the minimum standards in some events to attain a passing score. A cadets who fails the fitness test is reviewed by the Physical Education Review Committee, placed on athletic probation, and assigned to a physical reconditioning program.

Figure 2.6: Males' and Females' Average Physical Fitness Test Scores



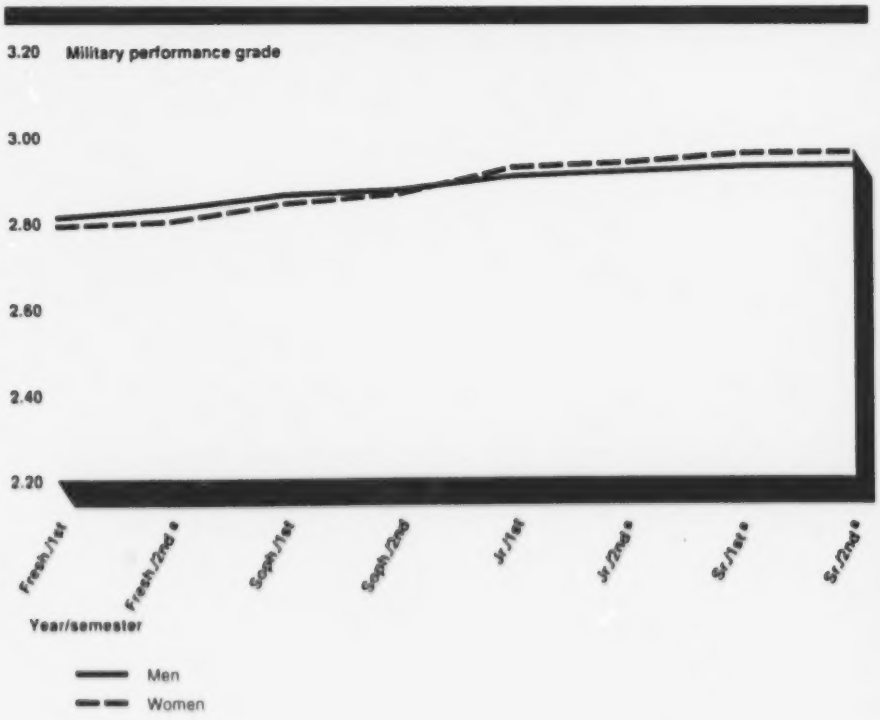
[a]Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

Women's Military Performance Was Comparable to Men's

For the classes of 1988 through 1992, female cadets' military performance averages were comparable to those of male cadets (gender comparisons for 8 semesters for 5 classes, totaling 40). Female and male cadets' averages varied slightly with each class's progression through the Academy. Females' averages were usually slightly lower than those of male cadets during their freshman and sophomore years but slightly exceeded them during their junior and senior years (see fig. 2.7).

Figure 2.7: Males' and Females' Cumulative Military Performance Averages for the Classes of 1988 Through 1992



[a]Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

Women Were Proportionately Represented in Leadership Positions

Cadets assume leadership positions beginning in their junior year. For wing-level or group-level positions, cadets are interviewed by a board of officers and senior noncommissioned officers prior to selection. Record reviews are conducted to ensure credibility, and potential capabilities must have been demonstrated prior to the interview. For squadron-level positions, cadet squadron commanders are selected by their Air Officers Commanding. The cadet squadron commander then makes the selections for the top three positions and reviews the selections for the remaining squadron positions. All squadron positions are subject to approval by the Air Officer Commanding. According to Academy officials, cadets generally hold only one leadership position (wing, group, or squadron level) but in some cases can hold more than one.

For the classes of 1988 through 1992, female cadets were represented in cadet leadership positions in proportion to their representation in their senior class. (We selected senior class leadership representation for comparison because, according to Academy officials, seniors hold the key leadership positions.) The 5-year average for female representation in cadet leadership positions (lieutenant and above) was 12 percent, while female representation in their classes was also 12 percent. This analysis involved five comparisons, one for each of the 5 years for which data were available.

Conduct, Honor, and Academic Review Systems

Gender-based differences also existed in the disposition of cases reviewed by two of three adjudicatory systems (conduct, honor, and academic).[4] In terms of the numbers of cases processed by the systems and the case outcomes, female cadets generally fared about the same as male cadets did in the conduct system, better in the honor system, and worse in the academic review system.

Men and Women Reviewed for Conduct at Equal Rates

For academic years 1987-89, female and male cadets fared about the same in the conduct review process. During this period, the Commandant's Disciplinary Board reviewed 146 cases. The rate of review (that is, the number of cases as a percentage of the female or male population) was about 1.1 percent for both men and women.

Women Accused and Convicted of Honor Offenses at Lower Rates Than Men

Overall, female cadets fared better than male cadets did throughout the honor system. The differences in review outcome rates, however, were not significant in any of the comparisons. For academic years 1987-89, the

[4]Between the fall of 1987 and the spring of 1990, both the Military Review Committee and the Physical Education Review Committee reviewed too few cases to allow for analyses of any gender-based differences.

honor system reviewed 812 cases in which cadets had been accused of honor code offenses. Of these cases, 94 involved female cadets, and 718 involved male cadets.

Female cadets were accused of honor offenses at a slightly lower rate than were male cadets: 5.3 percent versus 6 percent.[5] Female cadets also fared better than male cadets in the Honor Investigative Panel process. The Panel forwarded to the Wing Honor Board about 45 percent of the female cadet cases it reviewed, compared to about 52 percent of the male cadet cases.

In the cases reviewed by the Wing Honor Board, female cadets again fared better than male cadets. The Wing Honor Board found cadets in violation of the Honor Code in 40 percent of the female cases, versus about 43 percent of the male cases. Similarly, female cadets fared better than male cadets in the percentage of cases forwarded to the Honor Sanctions Board. This Board recommended disenrollment in about 27 percent of cases involving female cadets, versus about 30 percent of cases involving male cadets.

Women Generally Fared Worse in Academic Review System

Female cadets fared worse than male cadets did in the earlier two stages of the academic review process but fared better at the Academy Board stage. Our review encompassed academic years 1987-89.[6] During that time period, the academic review system reviewed 904 cases in which cadets' academic performance was below Academy standards. Of these cases, 159 involved female cadets (about 18 percent), and 745 involved male cadets (about 82 percent).

The Academic Review Committee reviewed proportionately more female cadet cases than male cadet cases: about 6 percent versus about 4 percent.[7] The female cadets' significantly higher review ratio may be related to their lower academic grade point averages. Again, according to Academy officials, the higher review rate for female cadets may be partly explained by the greater percentage of female cadets who were involved in time-consuming extracurricular activities such as varsity athletics. Female cadets also fared slightly worse than male cadets in terms of the numbers

[5]The rate is defined as the number of cadets accused of honor violations as a percentage of the cadet subgroup (for example, female or male) population for the time period studied.

[6]Academic Review Committee data for the classes of 1988 and 1989 were unavailable; the Academy retains such data for only 1 year following a class's graduation.

[7]The rate is defined as the number of cadet cases reviewed by the Committee as a percentage of the cadet subgroup (for example, female or male) population for the time period studied.

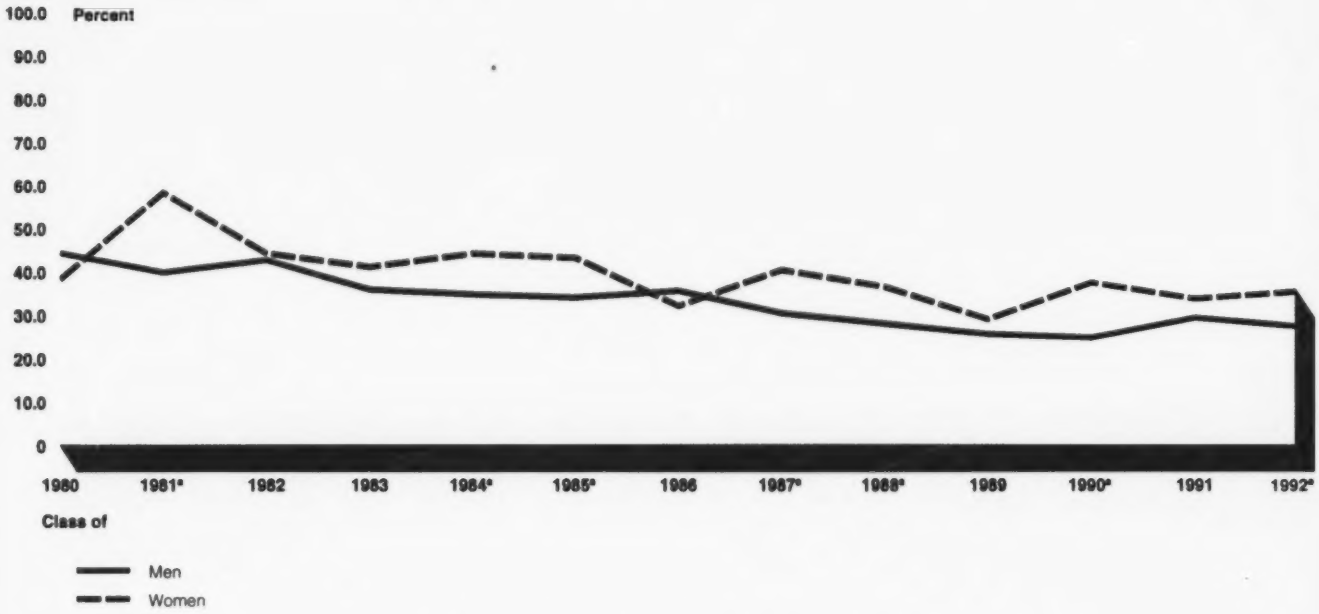
of cases forwarded by the Academic Review Committee to the Academy Board: 34 percent versus about 30 percent. While women's rate was higher, this difference was not significant.

While female cadets' cases were reviewed at higher rates than those of their male counterparts, women fared better at the Academy Board review stage. The Board recommended disenrollment in about 43 percent of the cases involving female cadets, compared to about 56 percent of the cases involving male cadets. This percentage represents a significantly lower rate for women. Despite this lower rate, however, less than 1 percent of male or female cadets were disenrolled for academic reasons (0.7 percent of men and 0.9 percent of women).

Women Had Higher Attrition Rates

For the classes of 1980 through 1992, proportionately more female cadets than male cadets left the Academy before graduating. For all classes, averaged together, about 40 percent of the female cadets left before graduating, compared to about 33 percent of the male cadets. For 7 of the 13 classes, the differences in attrition rates were significant (see. fig. 2.8). This analysis involved 1 gender comparison for each of the 13 classes, totaling 13 comparisons.

Figure 2.8: Male and Female Attrition Rates



[a]Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

While the number of both female and male cadets who leave the Academy declined significantly over their 4-year period at the Academy, women generally left the Academy slightly later than men did. For example, for the classes of 1988 through 1992, 54 percent of all women who left the Academy did so in their freshman year, compared with 64 percent of the men. During their sophomore year, 28 percent of the female attrition took place, compared with 20 percent of the male attrition.

Fewer Women Graduated in the Top 15 Percent of Their Classes

In the classes of 1988-92, the percentages of female and male cadets in the top halves of their graduating classes were essentially equal (49.9 percent of males and 50.9 percent of females). However, in four of the five graduating classes, a smaller percentage of female cadets than male cadets graduated in the top 15 percent of their classes. For the classes of 1988

and 1990, these percentages were significantly smaller. This analysis involved two gender comparisons for each of the classes, totaling 10 comparisons.

Class standings are important because they determine selection preference for flight school and because graduates in the top 15 percent of each class are given preference for future graduate education.

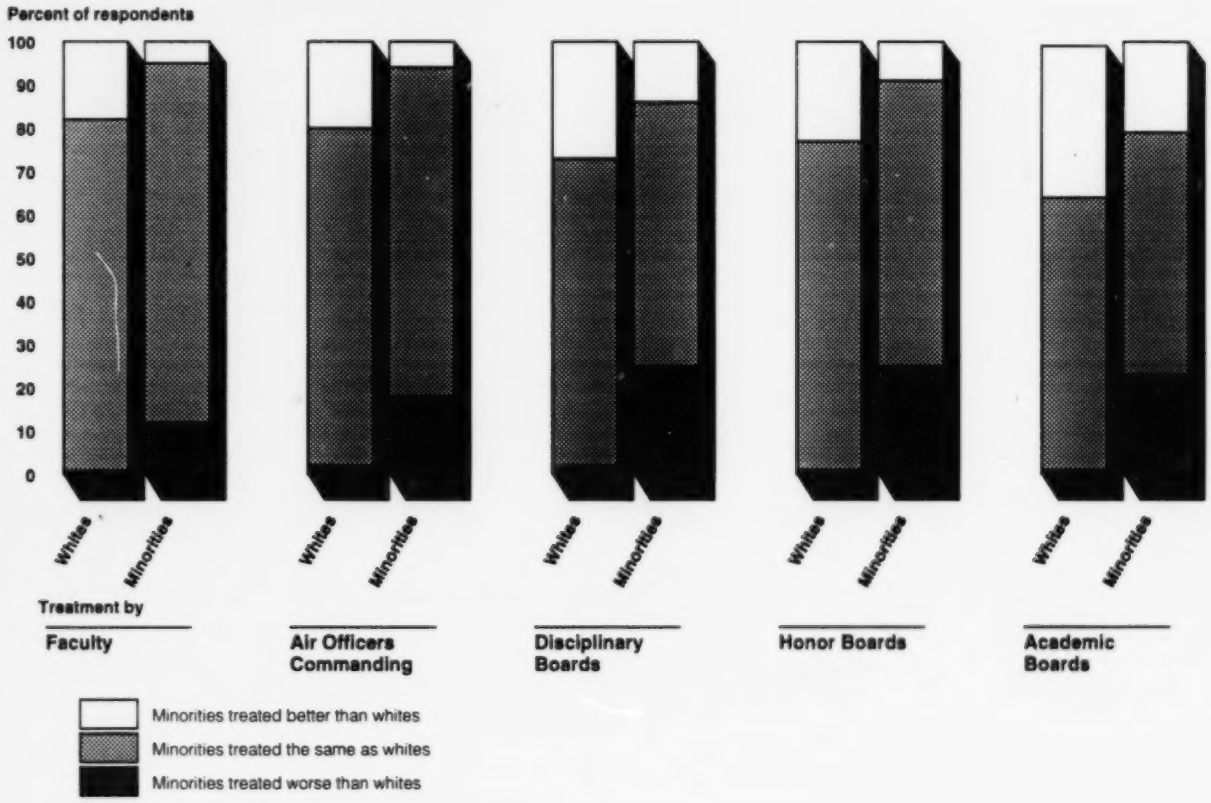
Academy Indicators Reveal Racial Disparities

On average, minorities had comparable physical fitness scores but lower academic admissions scores, academic grade point averages, and military performance averages. Minorities were also subjected to proportionately more academic and honor reviews than whites were. Minority cadets had higher attrition rates, and proportionately fewer minority cadets were either in the top 50 percent or the top 15 percent of their graduating classes. The differences in these indicators were often significant. The majority of cadets who responded to our questionnaire perceived that minorities were treated the same as whites.

Cadets' Perceptions of the Treatment of Minorities

In our questionnaire, we asked respondents to indicate whether they believed minorities were treated better than, the same as, or worse than whites by faculty, air officers commanding, disciplinary boards, honor boards, and academic boards. The majority of both white and minority cadets believed that minorities were treated the same as whites at the Academy. However, white cadets were more likely than minorities to perceive minority cadets as receiving preferential treatment. In addition, minorities were more likely than whites to perceive minority cadets as receiving less favorable treatment (see fig. 3.1).

Figure 3.1: Cadets' Perceptions of the Treatment of Minorities by Various Academy Groups



Source: Responses to GAO questionnaire.

Majority of Performance Indicators Showed Whites Did Better

Overall, as summarized in table 3.1, we made racial comparisons across 12 indicators, covering various areas of Academy performance. In 7 of the 12 indicators, significance tests consistently showed that whites did better: qualification rates, academic admissions scores, academic grade point averages, cumulative military performance grades, Academic Board review and separation rates, attrition rates, and class standings. In only one of the indicators—offer rates—did significance tests clearly show that minorities did better. In three indicators, comparisons showed mixed results: physical fitness scores, rates of conduct review, and honor charge

and conviction rates. A discussion of these indicators and our analysis follow.

Table 3.1: Summary of Racial Comparisons

Performance indicator	Data available	Number of comparisons	Comparisons that showed that minorities did better	Comparisons that showed that whites did better	Comparisons that showed minorities and whites equal
Qualification rates (see fig. 3.2)	Classes of 1991-95	5	0 (0)	5 (5[a])	0
Offer rates (see fig. 3.3)	Classes of 1991-95	5	5 (5[a])	0 (0)	0
Academic admissions scores (see fig. 3.4)	Classes of 1988-94	7	0 (0)	7 (7[b])	0
Academic grade point averages, by semester (see fig. 3.5)	Classes of 1988-92	40	0 (0)	40 (40[b])	0
Physical fitness scores (see fig. 3.6)	Classes of 1988-92	5	3 (1[b])	2 (0[b])	0
Cumulative military performance grades, by semester (see fig. 3.7)	Classes of 1988-92	40	1 (0[b])	39 (18[b])	0
Cadet leadership positions (see text)	Classes of 1988-92	5	0	0	5
Rates of conduct review (see text)	Academic years 1987-89	1	1 (0[a])	0 (0)	0
Honor charge and conviction rates (see text)	Academic years 1987-89	4	1 (1[a])	3 (2[a])	0
Academic Board review and separation rates (see text)	Academic years 1987-89	4	1 (0[a])	3 (3[a])	0
Attrition rates (see fig. 3.8)	Classes of 1980-92	13	1 (0[a])	12 (4[a])	0
Class standings (see text)	Classes of 1988-91	10	0 (0)	10 (10[a])	0

Note: ( ) indicates the number of significant differences using one or both types of tests.

[a]We used both a statistical significance and the 4/5s test for these comparisons.

[b]We used a statistical significance test for these comparisons.

Qualification and Offer Rates

Qualification Rates Were Higher for Whites

Admissions standards are the same for minorities and whites. For the classes of 1991 through 1995, a lower percentage of the minorities who applied to the Academy were deemed eligible. Specifically, during these years, about 28 percent of all white applicants, but only about 18 percent of minority applicants were determined to be qualified (five comparisons,

one for each class).[1] The higher rate for whites was significant for all the classes, as shown in figure 3.2.

Figure 3.2: Qualification Rates for Whites and Minorities

Note: All differences were significant using one or more tests.

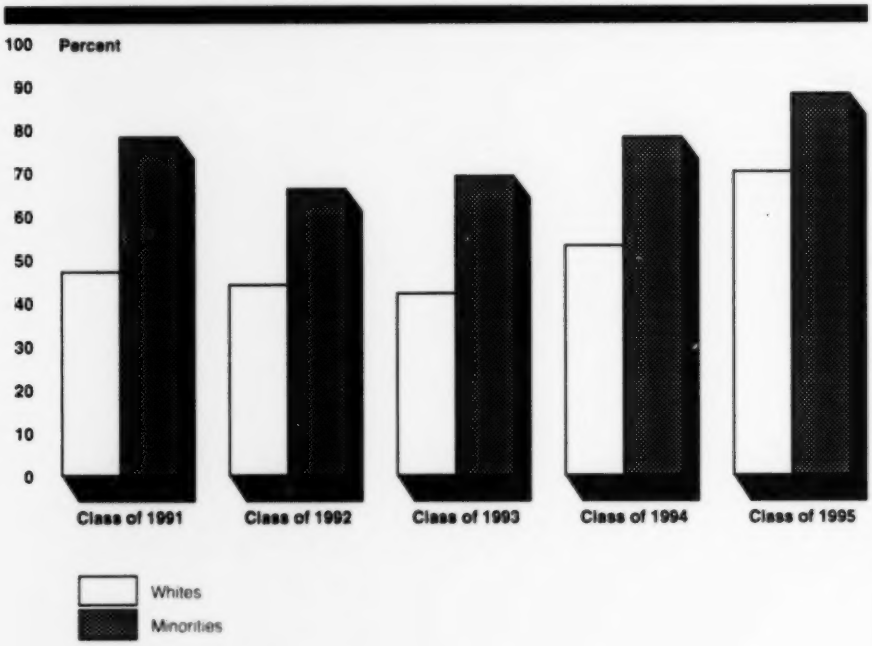
Source: GAO analysis of Academy records.

Offer Rates Were Higher for Minorities

Academy data indicate that for the classes of 1991 through 1995, 76 percent of the eligible minority applicants received offers from the Air Force Academy but only 51 percent of the eligible white applicants did so (five comparisons, one for each of five classes). The higher rate for minorities was significant for all the classes, as shown in figure 3.3.

[1]For presentation purposes, we do not always illustrate each comparison that we made because the pattern across semesters or class years was often similar. When we made comparisons for multiple years or semesters, we parenthetically note the numbers of comparisons we made.

Figure 3.3: Rates at Which Eligible White and Minority Candidates Received Offers



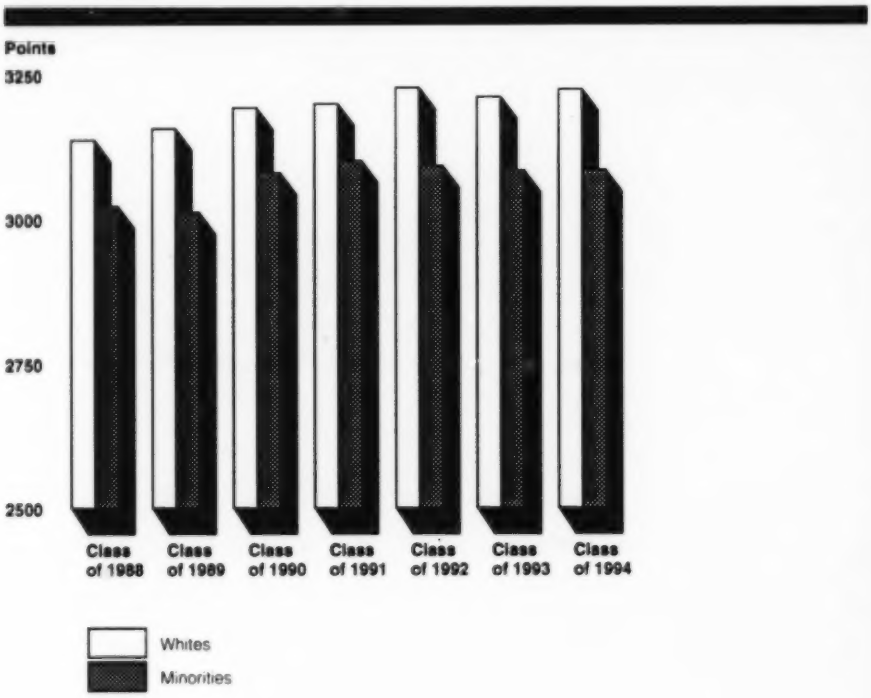
Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

Minorities Had Lower Academic Admissions Scores

Our review of the classes of 1988 through 1994 showed that the average academic admissions scores of qualified minority cadets were consistently lower than those of white cadets (see fig. 3.4). This analysis involved seven comparisons, one for each of seven classes.

Figure 3.4: Average Academic Admissions Scores for Minorities and Whites



Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

Minorities Had Lower Academic and Military Performance Grades

Consistent with Academy success predictors, the academic performance grades of minorities were below those of whites. Minorities' military performance grades were also below those of whites. However, minority cadets received higher physical fitness scores in three of the five classes we reviewed. Also, minority representation in cadet military leadership positions was proportionate to their representation in their classes.

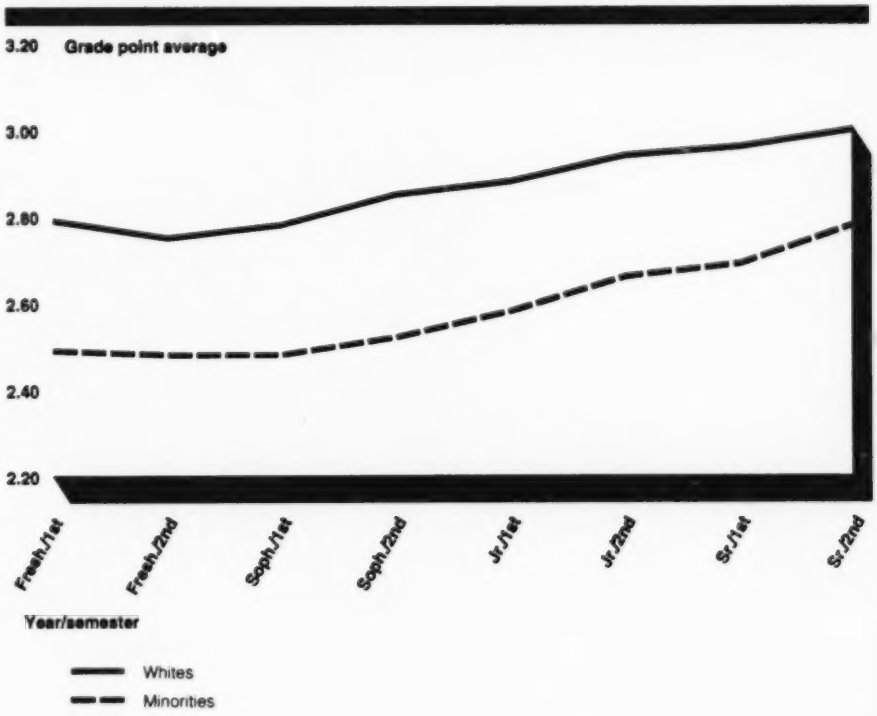
Minorities' Academic Grades Were Lower Than Those of Whites

Minority cadets in the classes of 1988 through 1992 consistently received lower grade point averages than white cadets did. This is consistent with Academy officials' view of the predictability of academic admissions scores. Specifically, cadets who enter the Academy with lower academic admissions scores (as was the case with minority cadets) would not be

expected to fare as well academically as those who enter with higher scores.

In contrast to the differences between female and male cadets' grade point averages, the differences between minority and white cadets' grades did not change as each class progressed through the Academy. This analysis involved comparisons for eight semesters for five classes, totaling 40 comparisons. The semester grades for the five classes have been combined in figure 3.5.

Figure 3.5: Grade Point Averages of Minority and White Cadets for the Classes of 1988 Through 1992



Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

To assess whether the observed differences between the academic performance of white and minority cadets were due to differences in academic potential that existed at the time they entered the Academy, we performed a series of regression analyses.[2] For the classes of 1988, 1989, 1990, 1991, and 1992, we ran regression analyses on the cadets' cumulative grade point averages at the end of each of their eight semesters. Entrance predictor composite scores[3] were entered into the regression equation as the first step, with gender entered as a second step, and race[4] entered as a third step. All three variables were entered in each equation regardless of any other criteria so that the direction of the relationship could be determined. This resulted in 40 separate regression analyses (8 for each of the 5 classes) where the independent effect of race could be assessed.

Overall, the Academy's entrance predictor composite scores were able to account for a relatively low proportion (23 percent to 35 percent) of the total variation in semester grade point averages. After controlling for differences in entrance predictor scores, race explained a small (0.2 percent to 2.0 percent) but statistically significant (at the 95-percent level of confidence) proportion of the variance in grade point averages in all 40 regression analyses. All 40 regression coefficients were negative and ranged from –0.08 to –0.19. The average regression coefficient for race across the 40 regressions was about –0.14, meaning that the grade point average of a minority cadet averaged 0.14 lower than that of a white cadet of the same gender with a comparable entrance predictor composite score. Thus, race was correlated with academic performance beyond the difference that could be explained by differences in entrance predictor composite scores.

Minorities Had Higher Physical Fitness Scores in Three of Five Classes

For the graduates of the classes of 1988 through 1992, minorities had better physical fitness test scores than whites in three of the five classes (see fig. 3.6). As stated in chapter 2, all cadets are required to take and

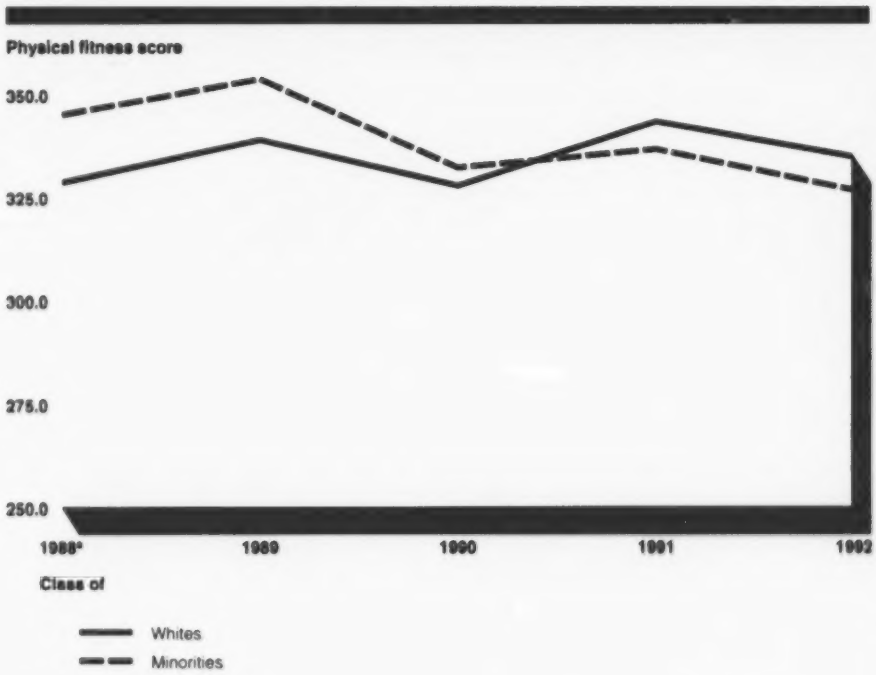
[2]A regression analysis is a statistical technique that allows the effects of multiple predictor variables to be simultaneously assessed. By entering the predictor variables into the regression analysis in separate steps, the unique contribution of a predictor variable to the variation in a criterion variable can be determined while the effects of all other measured predictor variables are controlled.

[3]We used the composite scores as an independent variable in this analysis because they are the main indicator that Academy officials use to predict academic success. We did not examine the development of this measure, and we make no assumptions about its validity in the admissions process.

[4]Race was coded into two groups: minorities (including blacks, Hispanics, Asians, and Native Americans) and whites.

pass (with at least 250 points) the physical fitness test, which is composed of five athletic events.

Figure 3.6: Average Physical Fitness Scores for Whites and Minorities



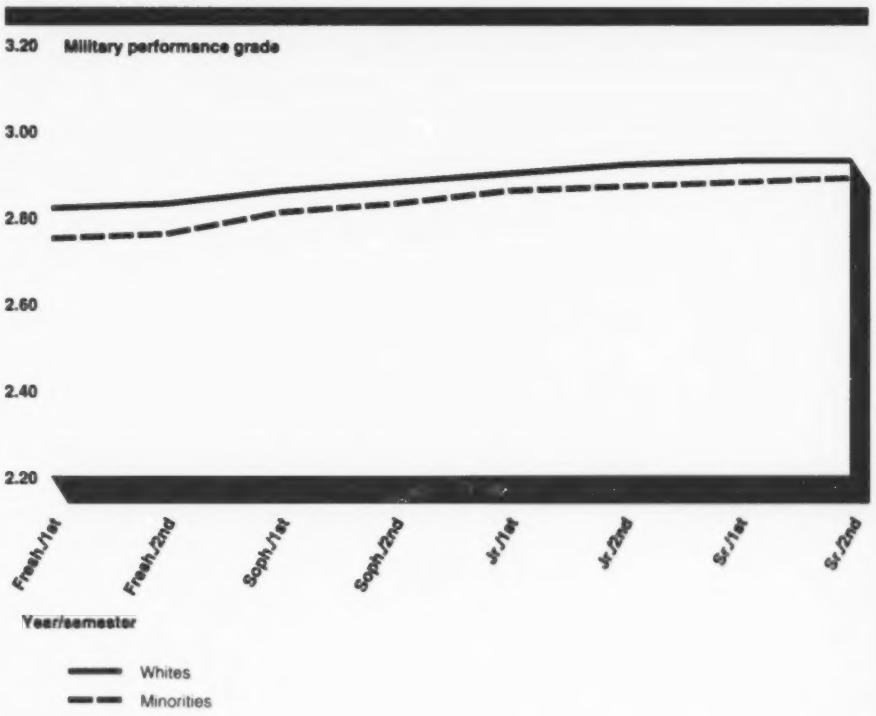
[a]Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

Minorities Had Lower Military Performance Grades

In reviewing 40 semesters of military performance data for the classes of 1988 through 1992, we found that the cumulative military performance averages of minority cadets were generally lower than those of white cadets (comparisons for 8 semesters for 5 classes, totaling 40). An Academy official stated that the distribution of military performance grades should be even for all cadet subgroups. Accordingly, minority cadets should fare as well as white cadets in this area. The data, however, demonstrated otherwise (see fig. 3.7).

Figure 3.7: Whites' and Minorities' Cumulative Military Performance Averages for the Classes of 1988 Through 1992



Note: All differences were significant using one or more tests.

Source: GAO analysis of Academy records.

Minorities Were Proportionately Represented in Leadership Positions

Minority cadets in the classes of 1988 through 1992 were represented in cadet leadership positions in proportion to their representation in their senior classes. For example, the 5-year average for minority representation in cadet leadership positions (lieutenant and above) was 13 percent, while minority representation in the class as a whole was also 13 percent. This analysis involved five comparisons, one for each of the 5 years for which data was available.

Conduct, Honor, and Academic Review Systems

Minority status-based differences did exist in the disposition of cases reviewed by two of three adjudicatory systems that we reviewed (conduct, honor, and academic). Minority cadets fared proportionately worse overall

than did white cadets in both the honor and academic review processes and about the same in the conduct system.

Whites and Minorities Reviewed for Conduct at Equal Rates

For academic years 1987-89, minority and white cadets fared about the same in the conduct review process. The rate of review by the Commandant's Disciplinary Board (that is, the number of cases as a percentage of the minority or white population) was 1.06 percent for whites and 1.04 percent for minorities. This analysis involved one comparison for the classes of 1988 through 1990.

Minorities Were Accused and Convicted of Honor Offenses at a Higher Rate Than Whites

Minority cadets fared worse in the earlier stages of the honor adjudicatory process but better at the Honor Sanctions Board stage than white cadets did. For academic years 1987-89, the honor system reviewed 812 cases in which cadets had been accused of honor code offenses. Of these cases, 157 involved minority cadets, and 655 involved white cadets.

Minority cadets were accused of honor offenses at a higher rate than were white cadets: almost 8 percent versus about 6 percent.[5] Minority cadets also fared relatively worse than white cadets did in the Honor Investigative Panel process. The Panel forwarded to the Wing Honor Board about 62 percent of the minority cadet cases it reviewed, compared to about 49 percent of the white cadet cases. Differences in the rate of accusation and in the percentage of cases forwarded were both significant.

In the cases reviewed by the Wing Honor Board, minority cadets again fared worse than did white cadets, though this difference was not significant. The Board found cadets to be in violation of the honor code in about 48 percent of the minority cases and about 42 percent of the white cases.

At the Honor Sanctions Board stage, minority cadets fared better than white cadets. After reviewing cases forwarded to it, the Honor Sanctions Board recommended disenrollment in about 23 percent of the cases involving minority cadets, compared with about 31 percent of the cases involving white cadets. This difference was significant.

[5]The rate is defined as the number of cadets accused of honor violations as a percentage of the cadet subgroup (for example, minority or white) population for the time period studied.

Minorities Generally Fared Worse in the Academic Review System

As they did in the honor review system, minority cadets fared worse than white cadets did in the early stages of the academic review process but fared better at the Academy Board stage. Our review included academic years 1987-89.[6] During that time period, the academic review system reviewed 904 cases in which cadets' academic performance was below Academy standards. Of these cases, 311 involved minority cadets, and 593 involved white cadets.

The Academic Review Committee reviewed 10 percent of minority cadet cases, compared with 3 percent of white cadet cases.[7] According to Academy officials, cadets who enter the Academy with lower academic admissions scores (as was the case with more minority cadets) are not expected to fare as well academically as those who enter with higher scores and are expected to be overrepresented in the Academic Review Committee's caseload.

Minority cadets also fared worse than white cadets in terms of the numbers of cases forwarded by the Academic Review Committee to the Academy Board: about 37 percent compared with about 28 percent. This difference was also significant.

While minority cadets' cases were reviewed at higher rates than those of their white counterparts, minority cadets fared better than white cadets at the Academy Board review stage. The Academy Board recommended disenrollment in about 49 percent of the cases involving minority cadets, compared to about 57 percent of those involving white cadets. This difference was not significant, however.

Despite the Academy Board's lower rate of recommending minorities for disenrollment, a significantly higher percentage of minority cadets were academically disenrolled: 1.78 percent of minorities as compared to 0.53 percent of whites. This percentage was higher for minorities because the greater proportion of minority cadets academically reviewed was not offset by the smaller proportion of minority cadets recommended for disenrollment by the Academy Board.

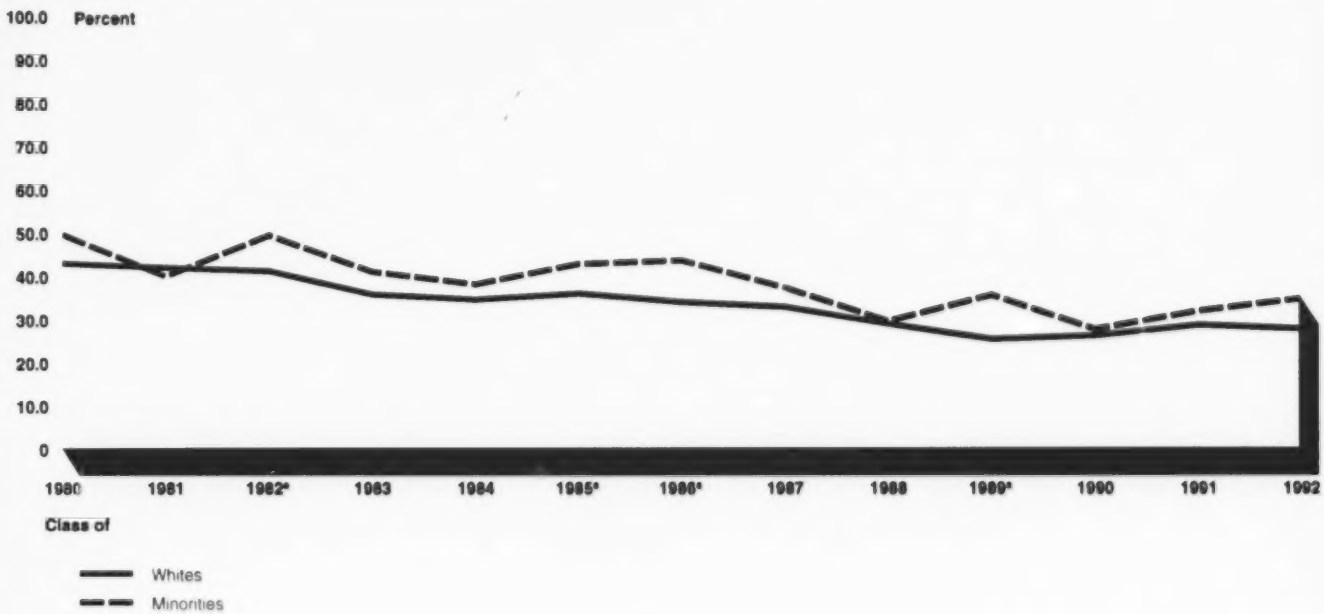
[6]Academic Review Committee data for the classes of 1988 and 1989 were unavailable; the Academy retains such data for only 1 year following a class's graduation.

[7]The rate is defined as the number of cadet cases reviewed by the Committee as a percentage of the cadet subgroup (for example, minority or white) population for the time period studied.

Attrition Rates

For the classes of 1980 through 1992, proportionately more minority cadets than white cadets left the Academy before graduating. For these 13 classes, about 38 percent of the minority cadets left before graduating, compared to about 34 percent of the white cadets (see fig. 3.8). This analysis involved 1 comparison for each of the 13 classes, totaling 13 comparisons. On a class-by-class basis, the differences were significant in 4 of the 13 classes.

Figure 3.8: Attrition Rates for Minorities and Whites



*Difference was significant using one or more tests.

Source: GAO analysis of Academy records.

While the number of attritions for both minority and white cadets declined significantly over their 4-year period at the Academy, minorities generally left the Academy slightly later than whites did. For the classes of 1988 through 1992, 59 percent of all minority cadets who left the Academy did so in their freshman year, compared to 63 percent of all white cadets.

During their sophomore year, 26 percent of the minorities left the Academy, compared with 20 percent of the whites.

Fewer Minorities Graduated in the Top of Their Classes

For the classes of 1988 through 1992, minority cadets were underrepresented in the top halves and top 15 percent of their respective graduating classes. For all five classes, 29 percent of minority cadets, versus 53 percent of white cadets, graduated in the top halves of their classes. Six percent of minority cadets, versus 16 percent of whites, graduated in the top 15 percent of their classes. Differences in both the top half and top 15 percent categories were significant.

As noted previously, class standings determine selection preference consideration for flight school, and graduates in the top 15 percent of their classes are given preference for future graduate education and/or flight school selection.

Academy Is Addressing Issues Involving Women and Minorities, but Methods for Monitoring Cadets' Performance Are Needed

Over the past few years, the Academy has taken a number of actions to address issues that affect women and minorities. Among these have been developing courses in human relations and establishing various officer and cadet councils and committees. In the spring of 1992, the Academy's Department of Behavioral Sciences and Leadership designed and administered a survey to 3,900 students to assess their attitudes and behaviors toward sexual harassment and racial discrimination. In February and March 1993, at the Academy's request, the Defense Equal Opportunity Management Institute evaluated and made recommendations to improve the human relations climate at the Academy. Finally, on May 20, 1993, the Academy's Ad Hoc Committee on Respect and Dignity issued a report exploring human relations issues at the Academy and recommending major initiatives to correct the deficiencies it discovered.

These actions should help women and minorities succeed at the Academy. However, the Academy (1) lacks a consolidated data base of student performance indicators; (2) has no method of determining whether significant disparities exist in cadets' performance; and (3) has not prepared a plan listing specific actions to be taken in response to deficiencies, dates by which it plans to take these actions, or measures by which it intends to determine the success of its actions.

Required Courses on Human Relations

Over the past few years, the Academy has developed the following core curriculum and selected topics in human relations for all classes of the Cadet Wing:

- During basic cadet training, cadets take one 1-hour class session in human relations. This class covers Department of Defense, Air Force, and Cadet Wing regulations on sexual and racial harassment and discrimination and on the importance of an equitable work environment. In addition, each spring semester, all officers, noncommissioned officers, and cadets who are scheduled to teach basic cadet training are required to attend preparatory classes. In these classes, instructors are taught how to work with new cadets and how to emphasize sensitivity in areas such as harassment, discrimination, and equal treatment.
- During their freshman year, cadets take one 50-minute class session in "Human Relations (Stereotypes, Values, and You)." During their sophomore year, they take one 50-minute class session per semester on sexual harassment. During their junior year, cadets take one 50-minute class session per semester in "Human Relations in Leadership." During their senior year, they take classes entitled "Professional Relationships"

and "The Commander's View of Human Relations." All these classes are part of the Academy's "Professional Military Training."

- In their freshman year, cadets also receive a lesson in Behavioral Science 110 on sexual harassment and date rape.

Several Groups Have Been Established to Promote Equal Opportunity

Over the past few years, the Academy has established several councils, committees, and programs to promote and enhance an equal opportunity environment:

- The Cadet Counseling and Leadership Development Center is staffed by male and female, black and white clinical personnel. Directed by a Deputy Head of the Department of Behavioral Sciences, it is responsible for counseling and guiding cadets in all areas of human relations and leadership. In accordance with Air Force Academy Regulation 537-37, on the "Cadet Wing Social Actions Program," the Center is also responsible for investigating complaints involving sexual and racial harassment.
- The Specialist Program is a 40-hour seminar that trains commander-selected third-class cadets to be peer counselors. This seminar teaches cadets to resolve human relations problems at the lowest level (in the squadron) and promotes their recognition of serious issues that need to be brought forward for further review and resolution.
- The Cadet Human Relations Council is chaired by the Cadet Vice Wing Commander (a senior cadet) and is made up of 12 cadets. Its purposes are to support the Air Force's equal opportunity and treatment program and to provide a channel of communication through which the Commandant can make cadets aware of policies, programs, and problems.
- The Cadet Interaction Committee is chaired by the Vice Commandant of Cadets and is made up of 12 members. The Committee's purposes are to summarize input received from the Cadet Human Relations Council and other sources sensitive to human relations issues and to propose recommendations to the Superintendent to facilitate the successful assimilation of women and minorities into the Cadet Wing.
- The Professional Interest Council consists of concerned cadets and officers who meet regularly to discuss issues affecting the assimilation of women into the Cadet Wing, as well as broader issues affecting all cadets.
- The Way of Life Committee originally started as a black student union. Membership was later opened to all minority and white cadets. The Committee's purpose is to address social and "quality of life" issues that have a direct impact on the enrollment and attrition rates of not only minority but also female cadets.

Academy's Social Climate Survey

On March 18, 1992, the Department of Behavioral Sciences and Leadership administered an attitudinal survey of cadets. Of the 4,400 cadets in the Wing, approximately 3,900 completed the survey. The survey assessed cadets' attitudes and behaviors in four areas: sexual harassment, racial discrimination, religious discrimination, and alcohol use.

Through its survey, the Academy discovered differences in the perceptions of its male and female and white and minority cadets.

Survey Findings on the Racial Climate at the Academy

According to the attitudinal survey results, cadets perceived a high degree of racial tolerance, acceptance, and integration at the Academy. However, the survey also indicated that equal opportunity training programs, while popular with black cadets, were unpopular with white cadets. Regarding reporting channels, black cadets were more willing to bypass the chain of command than were white cadets.

Academy officials reported that, in their view, the survey revealed that racial problems at the Academy were not of great magnitude. Even so, officials concluded that the racial climate could be improved, especially as it related to the Social Actions programs and the use of the chain of command.

Survey Findings Related to Gender Issues at the Academy

The survey's findings involving gender indicated that there was more hostility toward female cadets than toward minority ones. Although women were seen as effective in leadership roles, they continued to be the target of sexist jokes or demeaning remarks on a daily basis. In addition, the superior/subordinate relationship between male and female cadets was more than occasionally compromised by their fraternization.

The survey also indicated differences in perceptions of the way male and female cadets were treated. For example, 52 percent of the male cadets and 42 percent of the female cadets reported that Air Officers Commanding did not treat male and female cadets equally. Fifty-six percent of male cadets and 65 percent of female cadets reported the faculty treated males and females equally. (The wording of the question did not allow Academy officials to determine whether the unequal treatment was perceived as better or worse.)

Recommendations of the Defense Equal Opportunity Management Institute

On December 7, 1992, the Commandant of Cadets requested a Staff Assistance Visit from the Defense Equal Opportunity Management Institute to assess the quality of human relations training at the Academy and to help revise the cadet social climate survey. Between February 22 and March 1, 1993, a team of three members from the Institute visited the Academy to perform this evaluation. After its evaluation was completed, the team reported its findings and made recommendations.

The team's overall conclusion was that the Cadet Wing's human relations climate was good, "even though personal interviews revealed sexist and racist attitudes/behaviors and sexual harassment exist in the cadet environment." The team stated that "Command staff was knowledgeable of existing human relations problems/incidents and managing them properly. However, the existence of sexist and racist behaviors (e.g., jokes and racially derogatory remarks) if left unchecked could eventually detract from the Academy's mission."

The team recommended that the Academy take the following actions, among others:

- Revise the lesson plans in its Professional Development Program to remove bias and emphasize the value of diversity.
- Design operating procedures and instructions for the Academy's Social Actions program to ensure that it complies with Air Force regulations.
- Increase the publicity for and participation of cadets and officers in the Academy's human relations councils, committees, and clubs.
- Administer another social climate survey after changes have been made to the wording of certain questions.
- Continue to hold forums to communicate to the cadet population the negative aspects of the polarization of the Academy's subgroups from its majority population.
- Sensitize Academy staff members and cadets to the divisive impact of demeaning remarks about other groups.

Alleged Sexual Assault Prompts Academy to Undertake Initiatives

On February 14, 1993, a female Academy cadet alleged that she was sexually assaulted by three to five men dressed in civilian clothing. The Academy's Superintendent met with female cadets on February 23 and with male cadets on February 25 to discuss the incident. On February 24, the Superintendent established an Ad Hoc Committee on Respect and Dignity, made up of officers and cadets, to determine whether the reported assault represented an isolated event or was a symptom of broader and

more underlying problems. Focus groups were held on March 6 and on April 8 to discuss the human relations climate at the Academy. The Superintendent also collected data from female and male cadets in the form of administered questionnaires. The Committee administered questionnaires to 60 staff members.

Among the many concerns surfaced in the focus groups were that some cadets perceived that (1) minority celebrations and organizations devoted to racial/ethnic/gender pride contribute to distrust and a sense of isolation among minority cadets, (2) human relations infractions result from "unintentional insensitivity," and (3) there is a sanctioned quota system ("reverse discrimination") for the inclusion of female and minority cadets in key leadership positions.

The Committee's May 20, 1993, report to the Superintendent concluded that "Some at the Academy have lost sight of the fundamental necessity of treating others with respect and dignity." Among the Committee's far-reaching goals for the Academy were to (1) devise a set of "institutional outcomes" to guide its curriculum, policies, feedback, and reward structures; (2) reexamine the Academy's division into three mission elements headed by the Dean of the Faculty for academics, the Commandant of Cadets for military performance, and the Director of Athletics for athletic development; and (3) create an Office of Character Development, which would devise a master plan for cadets' character development.

Academy Has Prepared No Timetable for Responding to Problems Revealed in Survey

The Academy has taken some actions in response to the social climate survey's findings and to the Defense Equal Opportunity Management Institute team's recommendations. Its recent efforts arising from allegations of sexual assault show that the Academy is reexamining its human relations climate. However, the Academy has not always prepared a document consolidating a list of all specific actions to be taken in response to particular recommendations, timetables for these actions, or ways to measure the Academy's actions over time. Without such a plan, the Academy cannot systematically correct deficiencies or measure its progress in doing so.

Academy Lacks Consolidated Data Base for Tracking Disparities

During our review, we experienced many difficulties in collecting Academy data on cadets' performance. We began by gathering data from various Academy sources. Some information was available in the form of computer disks; other information was available only in hard-copy form. Thus, to analyze the data by class, gender, and race, we had to go through a series of steps to merge data bases. The Academy had no consolidated data base on cadets' performance measures.

The Defense Equal Opportunity Management Institute had similar problems with the Academy's data systems when it did its study. For example, in its report, the team noted that the Academy had no data-capturing systems to track disciplinary and rehabilitative actions in regard to violations of Air Force Regulation 30-2. The team was therefore unable to compare this type of data with similar Air Force-wide data. One of the team's recommendations was for the Academy to consider establishing a system for capturing and tracking human relations incidents and complaint data.

Academy Does Not Analyze Disparities to Determine Statistical Significance

We discussed with Academy officials the various cadet performance data they collect and how they use it. According to Academy officials, they collect and maintain performance data primarily to identify trends or patterns over time. However, they do not use measures such as statistical tests, the four-fifths rule, or regression analysis to determine when differences in the data may indicate significant disparities between various groups.

Conclusions

One of the first steps in dealing with disparities is recognizing where they exist. The Academy has taken some steps aimed at ensuring fair treatment for all cadets. These steps appear to be positive and should help to address any disparities. The recent actions taken by the Ad Hoc Committee on Respect and Dignity, for example, appear to represent a major step forward.

However, for these types of efforts to be most effective, more needs to be done. Specifically, during our own work, we encountered time-consuming difficulties in collecting the needed performance indicator and adjudicatory data because the Academy had no standardized, consolidated data base.

In addition, while the Academy may track cadets' performance data over time and may discover differences in cadets' performance in adjudicatory outcomes, it does not apply statistical analyses to determine which differences are significant and which are not. Without applying criteria to these differences, the Academy does not have sufficient assurance that it is focusing its attention on the ones meriting further attention.

Finally, in order to monitor the effectiveness of various actions, the Academy has not documented the specific actions it has taken or plans to take in response to recommendations designed to reduce gender and racial disparities. Neither has it established timetables for implementing initiatives or measures to determine these initiatives' success over time.

Recommendations

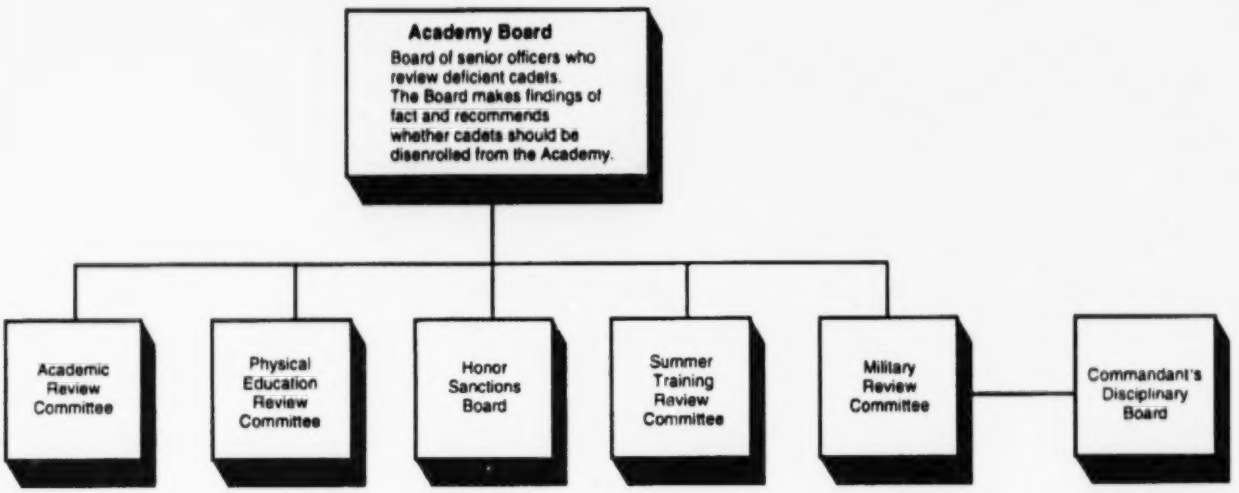
As part of the Air Force Academy's efforts to ensure the fair and equal treatment of all cadets and to improve efforts to monitor gender and racial disparities, we recommend that the Superintendent of the Air Force Academy

- develop a relational data base capability allowing routine analysis of key performance indicators;
- establish criteria for assessing when disparities warrant more in-depth attention and corrective action; and
- prepare (1) a plan of action and milestones document to track actions taken in response to problems revealed through studies or surveys and (2) specific measures with which to assess the effectiveness of the Academy's actions over time.

The Air Force Academy's Review Systems

As directed by 10 U.S.C. 9351, the Academy Board is responsible for reviewing cadets' conduct and physical, military, and academic performance at the Air Force Academy. The Academy Board consists of 10 senior Air Force officers and is chaired by the Superintendent of the Academy. To help carry out its statutory obligation, the Academy Board has established several committees (see fig. I.1).

Figure I.1: The Air Force Academy's Review Committees


Academy Board
Board of senior officers who review deficient cadets. The Board makes findings of fact and recommends whether cadets should be disenrolled from the Academy.
Academic Review Committee
Physical Education Review Committee
Honor Sanctions Board
Summer Training Review Committee
Military Review Committee
Commandant's Disciplinary Board

Note: The Commandant's Disciplinary Board, while not an official standing committee of the Academy Board, operates similarly.

The Academic Review Committee evaluates cadets who are deficient in academics. This Committee may recommend that cadets be placed on remedial plans or academic probation. It may also refer a cadet whose academic deficiency demonstrates a lack of aptitude for commissioned service to the Academy Board for disenrollment or denial of graduation.

The Military Review Committee evaluates the records of cadets whose conduct or aptitude for commissioned service is questionable. It may place

a cadet on conduct or aptitude probation; refer cadets to the Academy Board for possible disenrollment; or, in the case of first-class (senior) cadets, deny or delay graduation.

The Physical Education Review Committee evaluates cadets whose physical fitness or performance in physical education or intramural training is deficient. It may prescribe corrective measures, refer cadets to the Academy Board for possible disenrollment, or delay or deny the graduation of a first-class cadet.

The Summer Training Review Committee evaluates cadets whose performance or conduct during cadet summer training programs demonstrates questionable aptitude for commissioned service. It may prescribe corrective measures, refer cadets to the Academy Board for possible disenrollment, or deny the graduation of a first-class cadet.

The Honor Sanctions Board reviews the cases of all cadets found in violation of the cadet honor code. It may prescribe corrective actions or refer cadets to the Academy Board for possible suspension or disenrollment.

The cadet disciplinary system is administered by the Commandant of Cadets, who is an Air Force officer. The Commandant refers serious conduct violations to the Commandant's Disciplinary Board. On the basis of the Disciplinary Board's recommendations, the Commandant may either prescribe corrective actions or recommend that cadets be disenrolled from the Academy.

Description of Questionnaire Methodology

This appendix describes our questionnaire development process, sampling approach, response rates, weighting of data, processing of completed questionnaires, sampling error, and other methodological issues. This report is part of a broader review of the Department of Defense's service academies. That review focuses on academics, military performance measurement, hazing, harassment, and the operation of academy adjudicatory systems in addition to the treatment of women and minorities.

Questionnaire Development

We developed questionnaire items to address the full scope of the broader review. We pretested the questionnaire with a diverse group of cadets who represented different classes, genders, and races. The questionnaire was also extensively reviewed by (1) Air Force Academy officials, (2) the Defense Advisory Commission on Women in the Service, and (3) our consultants familiar with the academies.

Sampling Methodology

To ensure that an adequate number of women and minorities were included, we used a stratified random sample design allowing us to oversample those two groups. We used the last digit of the social security number to randomly select respondents from each strata.[1] We selected one final digit for all cadets and an additional final digit for women and minority males. Our goal was to produce a sample of about 10 percent of white males, 20 percent of females, and 20 percent of minority males.

Questionnaire Response Rates and Weighting of Data

We administered the questionnaires in March 1991. We assured respondents of anonymity, and we did not take attendance.

We received completed questionnaires from 493 Academy cadets (a response rate of about 91 percent). Since we oversampled on the female and minority subgroups, we applied weights to the responses in order to allow them to represent the total Academy population. We computed raw weights by dividing the number of subgroup responses into the subgroup population.

Sampling Error

Since we surveyed samples of cadets rather than entire populations, the results we obtained were subject to some degree of uncertainty, or

[1]The last four digits of social security numbers constitute a random field based on the order in which individual social security offices process the applications they receive. Selecting one final digit can be expected to yield a sample of about 10 percent.

"sampling error." Sampling errors represent the expected difference between our sample results and the results we would have obtained had we surveyed the entire populations. Sampling errors are smallest when the percentage split responding to a particular question is highly skewed, such as 5 percent responding "yes" and 95 percent responding "no." Sampling errors are greatest when there is about a 50-50 percentage split in responses.

On the basis of the number of completed questionnaires, we estimate that our results can be generalized to the cadet population at the 95-percent confidence level, with a maximum sampling error of plus or minus 4.3 percent.

The sampling errors for various subgroups cited in this report appear in table II.1. The decimal figures in the table are the sampling errors that correspond to various percentages of respondents selecting a particular response alternative. For example, if we state that 10 percent of the cadets responded in a given way, according to the table, the sampling error is 2.8 percent (there was a 10-90 percent response split). This means that we can be 95-percent confident that the percentage of cadets responding that way in the population is within 10 percent plus or minus 2.8 percent, or between 7.2 percent and 12.8 percent.

Table II.1: Sampling Errors for Various Academy Subgroups

			Percentage split in responses									
Subgroup	Population	Sample	05/95	10/90	15/85	20/80	25/75	30/70	35/65	40/60	45/55	50/50
All cadets	4,354	493	2.2	2.8	3.1	3.4	3.7	3.9	4.1	4.2	4.2	4.3
Men	3,804	379	2.6	3.3	3.8	4.0	4.3	4.5	4.7	4.8	4.9	4.9
Women	550	114	5.2	6.2	7.0	7.6	8.0	8.3	8.3	8.5	8.6	8.6
Whites	3,639	347	2.8	3.5	4.0	4.1	4.5	4.7	4.9	5.1	5.1	5.2
Minorities	715	146	4.5	5.4	6.1	6.6	7.0	7.0	7.3	7.4	7.6	7.6

Analysis of Academy Data

Type and Sources of Data

During our review, we analyzed the computerized records of over 9,900 cadets from the classes of 1988 through 1994. We converted this data into a different format for statistical analysis. We did not verify the computerized information we obtained from the Academy, but we did review the reformatted information for accuracy and reliability. We then developed data files for each semester and class. We developed information on military performance grades, leadership positions, cumulative and semester academic grade point averages, attrition, physical education grades, and class standings.

The Air Force Academy was generally able to provide computerized data covering the classes of 1988 through 1994. However, we generally restricted our analysis to the fully completed classes of 1988 through 1992, the five classes for which we had all 4 years' worth of data (for freshman through senior years).

Other kinds of information were not available on any computerized data base. Consequently, we extracted data from hard-copy records maintained by the appropriate Academy body. The following is a summary of the types of data and sources we used:

- The Office of Institutional Research provided us with statistics on the numbers of applications, qualified applicants, and admissions by gender and race/gender for the classes of 1980-93.
- The Academic Review Committee allowed us access to the hard-copy files it maintains in the Registrar's Office on Academic Board decisions. We extracted relevant information for all the students who appeared before the Academic Board during academic years 1987-89.
- Officials in the Commandant of Cadets' Plans and Policies Division provided us with hard-copy files on conduct offenses charged during academic years 1988-90. The information contained the name of the offender, the dates of the conduct board's hearing, the type of offense, and the punishment. The information also included the gender and race/ethnicity of offenders.
- The Director of Honor and Ethics provided us with hard-copy files containing all honor offense cases charged between March 1987 and May 1990. The information contained the type of offense, the date of the offense, the dates of hearings and decisions, the punishment, and the gender and race/ethnicity of the offender.

Assessment of Disparities

The information we used to compare the various subgroups is "population data"—that is, it includes every student enrolled in that class. Therefore, any observed differences between subgroups are real differences since there is no sampling error in population measurements. However, to avoid misinterpreting the importance of differences or placing too much emphasis on small numerical differences, we assessed how substantive any observed differences were. In effect, we treated the various populations, such as the classes of 1988-92, as if they were subpopulations of a larger population.[1]

To assess whether any regularity existed with regard to the direction of observed differences, we counted the number of times each subgroup was lower or higher on each measure for each period examined.

We used various tests to assess whether a given observed gender or racial disparity was sufficiently large that we could rule out chance as the cause.

The "Four-Fifths" Test

We adopted the "four-fifths" test as one measure of whether an observed difference between two groups was significant. This test is similar to the rule of thumb established by the four federal agencies responsible for equal employment opportunity enforcement (the Department of Justice, the Department of Labor, the Equal Employment Opportunity Commission, and the Office of Personnel Management) for determining whether differences between subgroups in the selection rates for hiring, promotion, or other employment decisions are significant.[2]

Under the four-fifths test, a selection rate for a subgroup that is less than four-fifths (or 80 percent) of the rate for the group with the highest selection rate is considered a substantially different rate. We recognize that others have applied the four-fifths test only to selection rates for actions involving positive consequences. However, we judgmentally chose to apply the four-fifths test to both selection and nonselection indicators (such as academic grades). We also chose to transform the four-fifths formula to apply to decisions involving negative consequences, such as

[1]For a discussion of applying statistical significance tests to population data, see R. E. Henkel, Tests of Significance (Beverly Hills, California: Sage Publications, 1976), pp. 85-87; and M. J. Hagood, "The Notion of a Hypothetical Universe" in D. E. Morrison and R. E. Henkel (eds.), The Significance Test Controversy: A Reader (Chicago: Aldine Publishing Company, 1970).

[2]See the Uniform Guidelines on Employee Selection Procedures (29 C.F.R. section 1607). We recognize that title VII of the Civil Rights Act of 1964, which protects individuals against employment discrimination, does not apply to the uniformed members of the armed services. See Roper v. Department of the Army, 832 F.2d 247 (2nd Cir. 1987).

disciplinary, honor offense, attrition, and academic failure rates. We used a rate greater than 125 percent (five-fourths) as an indicator of a significantly higher rate for a negative consequence. That is, for a negative consequence (such as an honor conviction), a rate of more than 125 percent of the rate for the subgroup with the lower rate would be considered a significantly different rate.

Chi-Square Test

For categorical data, such as whether a cadet was charged with an honor offense or not, we used the chi-square test to assess whether the difference between subgroup proportions was significant. We used the standard 0.05 level of significance, meaning that we accepted a difference between subgroups as statistically significant if there was a 5-percent or less chance of getting a difference that large if there were no real difference between the subgroups.

T-Test

For continuous data, such as academic grade point averages, we used the t-test to assess whether the subgroup means were substantially different. We first assessed the variances of each subgroup on each measure to determine whether or not they were approximately equal. If the variances were equal, we used the pooled-variance formula for the t-test. If the variances were unequal, we used the separate-variance formula for the t-test.[3] We used the standard 0.05 probability of error as the criterion for assessing statistical significance.

Each Kind of Test Is Problematic

Both the chi-square and the t-tests are relatively sensitive to differences under some circumstances, but they are relatively insensitive under others. The tests that we used tend to be reactive to the number of cases. For example, when few people are subject to a particular kind of action and the resulting number of cases is therefore small, relatively large subgroup differences may not reach statistical significance. As the number of cases increases, smaller differences between subgroups become significant.

The four-fifths test, since it focuses solely on the ratio of the two rates, is unaffected by the number of cases and is therefore sensitive to differences even when the number of cases is small. However, when the number of cases is large, resulting in more stable rates, the four-fifths test may provide too much latitude before a difference would be seen as significant.

[3]SPSS User's Guide, 3rd ed. (Chicago: SPSS, Inc., 1988).

Since none of the tests was wholly satisfactory, we chose to apply multiple tests. If we found a difference to be significant under any of the tests, we considered that difference to be significant.

Major Contributors to This Report

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